VOL. XXV NEW YORK—THURSDAY, AUGUST 24, 1911—CHICAGO No. 8

THE AUTOMOBILE

Making Motor Trucks Stay Sold

How Sellers Keep Watch of Cars in Service

Progress in introducing automobile trucks is vastly helped if the cars in service are kept in a state of efficiency and in order to reach that end nearly all the sellers of trucks keep some kind of official or unofficial supervision of their product in the hands of purchasers. These systems of inspection are extremely varied, but they are all directed toward keeping the cars on the road in shape to perform their duties with economy.

INTRODUCING automobile trucks to the commercial world differs diametrically from the selling of pleasure cars to the general public. There is little in common between the two great branches of marketing cars. On the other hand, the pleasure or utility automobile designed to carry passengers primarily for pleasure, but frequently for business, as in the case of physicians, contractors and salesmen, affords an entirely different selling angle from truck distribution.

The man who buys a car for personal transportation is moved most forcibly by the appearance, price, speed, beauty, silence, grace of performance of the automobile presented, but the buyer of trucks only considers performance as the prime requisite. On the general average it has been demonstrated that it costs approximately 19 cents a mile to operate a passenger automobile and only a comparatively few owners scan the cost figures with searching care. On the other hand, the concern that uses automobile trucks in its business enters and compiles each item of cost with the most scrupulous care. If gasoline consumption shows higher than its normal level; if the tire mileage is less than the purchaser of the car had been led to believe it should be; if the car has to be shopped more frequently and consequently is put out of service longer per month than the owner

A—INSPECTING CARS FOR EXCESSIVE LOAD BEFORE STARTING 14-MILE RUN TO SUBURBAN DEPOT OF BIG RETAIL STORE

C—Small Lansden car used for city deliveries
D—Pair of White trucks transferring freight from warehouse to depot

B—Automobile trucks have widened the scope of retail merchandizing and great care is used in maintaining the cars

thinks it should be, the makers and sellers of the car hear all about it immediately.

In the general movement which is now in progress toward the motorization of all trackless travel, probably one-quarter of the horses that have been displaced by automatic power have fallen before the passenger automobile of private ownership. Fully three-quarters of the jobless horses have resulted from the competition of the truck and even at that the motor truck has provided much work for the equines by extending the scope of business, thus furnishing a use, even if it is only temporary, for thousands of horses that had been originally displaced by the installation of the more economic form of transit.

Service departments for quick, economic and skillful repair and maintenance work have been established pretty generally where there are large numbers of any of the standard makes of automobiles in use and recently the scope of their work has been largely increased by including the trucks within their jurisdiction.

As a general proposition trucks are sold under a guarantee as to materials and workmanship and where a part yields through latent defect and without fault of the operator and owner it is replaced by the selling company without cost.

In the past this provision seemed more important than it does at present, for with the improvement in the methods of manufacture the chance of including some defective part in the assembled car is reduced and the chance of discovering it before it leaves the factory is increased. Then, too, designing has progressed enormously in all directions and the class of materials is better than it was in the early days of truck manufacture.

All these things lend themselves to longer life in the truck and more satisfactory service.

But now after several years of trial and experiment the automobile truck is coming into its own. The manufacturing companies that have alertly followed the trend of events find themselves with more business than they can handle and each day finds many more trucks in service in all lines of commercial work. Buyers are no longer moved to purchase on insufficient grounds. They want to know what the car will transport goods per ton-mile by the year and how much it will cost to keep the car on the road and up to its highest efficiency. The price is important, too, but not the prime essential. For certain classes of work the owner asks himself not: "Can I afford to pay the price?" but "Can I afford not to pay the highest price?"

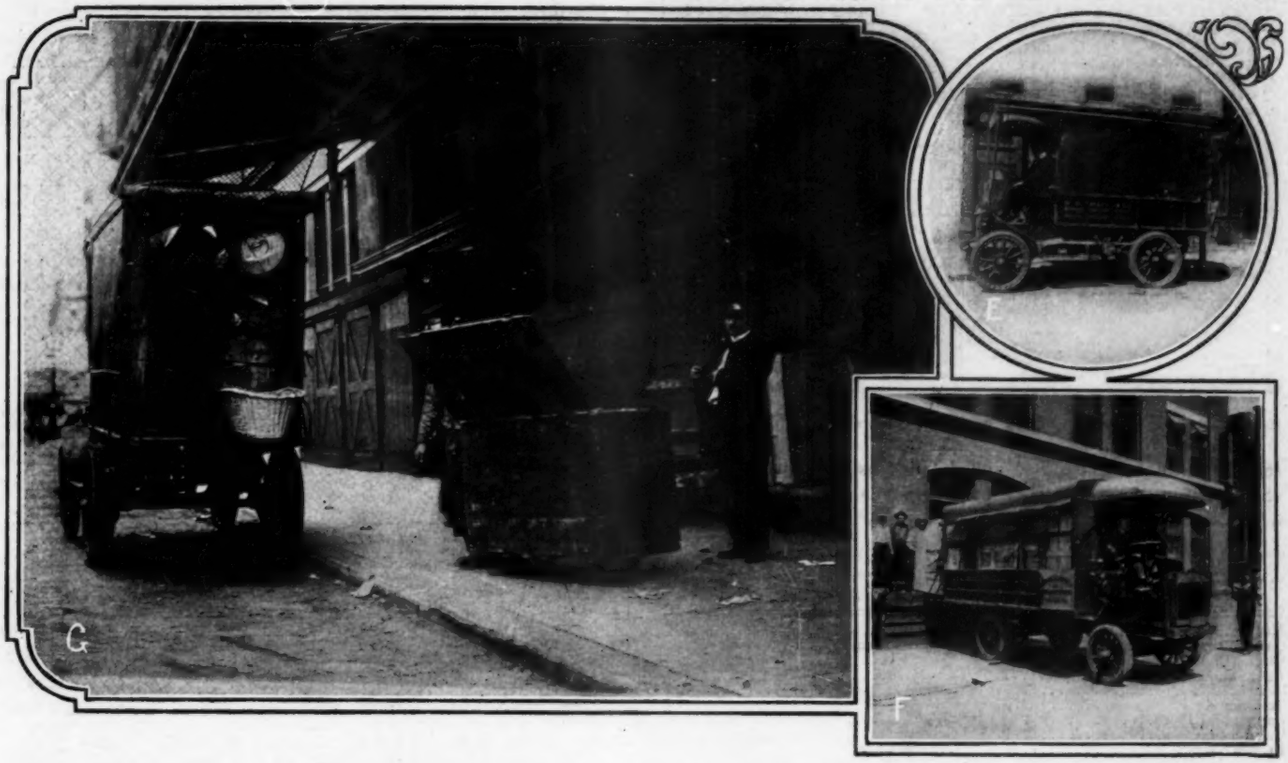
The only reason that the truck has obtained a foothold in the commercial life of the world is founded on its service. If a concern invested $50,000 in trucks and for any reason they were laid up half of the time, the future business in the truck line of that concern would be difficult to get.

The transition from horse-drawn traffic to motorization as far as it has progressed is due to the fact that the trucks do more work than horses at less money cost. Any time that the reverse condition obtains the automobile truck business will decline and die. The single question that confronts all hands identified with the making and using of trucks is service and in order to solve the problem the sellers of trucks keep a fatherly eye upon their product during the life of usefulness.

The system is known by various names in various companies, but its object is the same in all of them, namely, to keep their cars on the road and in condition to earn money for their owners.

When a big concern decides that in order to keep up with the business procession the time has arrived to motorize its transfer and delivery departments, the practice in the past has been to simply buy as few trucks as the salesman will allow them and then to turn over this equipment to the barn boss of the concern with orders to sell off the horses and get busy with the new equipment.

The barn boss may know all about horses and nothing at all with regard to automobiles. This condition is likely to be fiercely accentuated as it applies to his drivers. Putting a mule driver behind the wheel of a $5,000 truck has been quite an ordinary experience and needless to say has proved costly. There is nothing supremely difficult about driving a commercial car. The mechanism is simple, the controls easily mastered and the main principles are not specially involved. Many a horse-driver has made good as an operator of a power truck without special



G—Starting small truck on its daily journey of sixty miles—note the care used in packing the load

E—Randolph truck used for the long hard runs in suburban delivery
F—Heavy duty Alco truck with a load of pianos

schooling, but the percentage of failures in this regard is appalling. The steering presented few difficulties and control was not very puzzling to the average alert driver. The brakes proved bothersome and when it came to the mechanical processes the horse driver was not at home. It took him a long time to learn that lubricating oil in proper quantities was more essential to operation than gasoline and that a burned-out bearing was more serious than a balky team.

Consequently the education of the barn boss and the driver is of great importance when the concern contemplates motorizing its transportation system. The essential character of education in this line has always been recognized by those closely in touch with the industry. The Y. M. C. A. has conducted schools in which drivers and operators of trucks may receive instruction as to their duties, and the New York Fire Department is about to institute a school to train drivers and mechanics for its new power-driven fire apparatus. On July 27 the Packard Company announced that it would maintain a school of instruction for operators of its cars owned by commercial concerns and at the first session of this school there were over twenty students present.

In all these schools the main object to be attained is to emphasize upon the minds of the students the necessity of not doing certain things. Of course the instruction includes affirmatively what should be done ordinarily, but it brings out sharply the necessity for not doing certain things under emergency conditions. These prohibitions include such things as avoiding the attempt to repair a broken crankshaft on the road; or adjusting the magneto; attempting to run without water or oil and a dozen other phases of impossible motoring, at least as far as the inexperienced driver and mechanic are concerned.

The school idea is excellent and in the course of time the business of driving will be on a materially higher plane than it is at present. In fact education is probably the most important thing about operating a truck, because when the operator of a commercial truck knows just what to do, a vast amount of trouble will be saved to the makers of the cars and a vast amount of additional service will be insured to the owners thereof.

The present practice in marketing trucks is to extend the interest of the manufacturers of the cars to their service, as long as they shall remain in service, with the idea of making this period of useful life as long as possible.

The service departments established in many sections are one of the channels through which the manufacturers extend their interest, but in addition to the actual repair departments the system of inspection referred to above is coming into more general use with each season.

There are a number of these systems in operation, ranging all the way from a kind of street-detective plan by which truck experts examine cars made by their company with or without the knowledge of the drivers and report to the owners of the trucks that certain things are amiss and should be corrected, to an elaborate plan of instruction, personal help, periodic inspection and complete reports on the condition of the cars, such as is the plan kept in operation by the Packard Company, for instance.

One of the typical systems in general use in New York and elsewhere may be described briefly as follows:

When a truck is sold the company selling takes the foreman of the purchasing concern under its wing and instructs him in the mechanical principles of the car and teaches him the details of operation. Then for two days, an expert is detailed to go along with the driver of the car to inform him of its workings. After this the company makes regular inspections of the car and recommends changes, alterations, adjustments and repairs.

In carrying out this plan of comprehensive interest in its cars the following forms are used. The first is a form used in making either regular inspection reports or incidental reports. If one of the cars happens to be seen by an inspector and its condition is not first class, he makes out a report covering the case and as much of it as is necessary is transmitted to the owner with recommendations. Naturally these incidental

H—Unloading a shipment of big metal receptacles from a Randolph car

reports are not so complete and detailed as those which follow regular inspections, but they may be made on the same form, which is as follows:

TRUCK INSPECTION REPORT

..... *Date*.....

..... *Motor No*..... *Wagon No*.....

Motor	Chains
Carbureter	Transmission
Circulation	Wheels
Ignition	Tires
Clutch	Springs
Steering Gear	Mileage
Lamps and Horn	Body
Lubrication	Driving
Brakes	General Care

Remarks:

.....

.....

.....

Signed.....

As a cross check on the cars some of the companies urge a careful tabulation of each item of daily expense on each car operated. These tabulations give mileage, material and other items in the daily cards and these totals are transferred to monthly reports from which yearly records are made up. By simple divisions, the wagon mile cost and ton-mile cost may be deduced as applied to total expense and with relation to each of the various factors that go to make up operative costs. These, as have been shown authoritatively in THE AUTOMOBILE, consist of tires, fuel and oil, garage work and supplies and do not take wages of crew and garage rentals into consideration.

The forms are as follows. The first is the daily trucking sheet:

DAILY TRUCKING SHEET

Truck No..... *Driver*..... *Date*.....

Material	Quantity	From	To	Arrived	Left	Miles

The second is the monthly expense statement:

MOTOR TRUCK EXPENSE STATEMENT

No. of Truck..... *Driver*..... *Month*.....

	1	2	3	4	5	(to 31)	Total	Daily Ave.
Wages (including overtime)								
Expense, Help, etc								
Garage								
Washing Car								
Gasoline								
Lubricants								
Tires								
Other Supplies								
Repairs to Machinery (Routine)								
Repairs to Machinery (Accident)								
Repairs to Body and Gear (Routine)								
Repairs to Body and Gear (Accident)								
Total Daily Operating Cost								
In Service								
In Shop								
In Reserve								
Daily Mileage								
Daily Load								

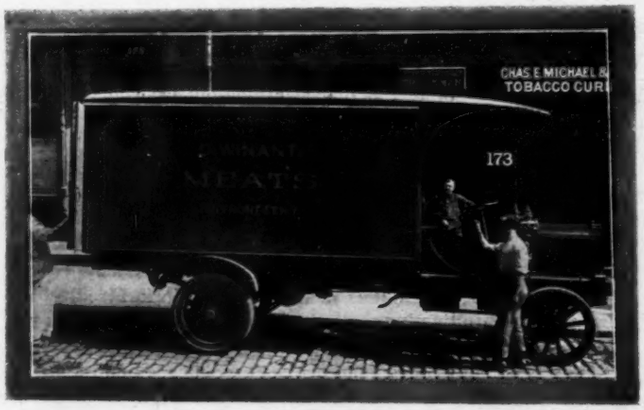
The third is the yearly statement:

MOTOR TRUCK EXPENSE STATEMENT, 191

No. of Truck.....*Capacity*.....*Cost* $.....*Put in Service*.....

	Jan.	Feb.	(to Dec.)	Total for Year	Average per Month
Wages (including overtime)					
Expense, Help, etc					
Garage					
Washing Car					
Gasoline					
Lubricants					
Tires					
Other Supplies					
Repairs to Machinery (Routine)					
Repairs to Machinery (Accident)					
Repairs to Body and Gear (Routine)					
Repairs to Body and Gear (Accident)					
Total Monthly Operating Cost					
Number of Days In Service					
Number of Days In Shop					
Number of Days In Reserve					
Monthly Mileage					
Average Daily Mileage					
Month by Load					
Average Daily Load					
Operating Cost per Day in Service					
Operating Cost per Mile					
Operating Cost per Load Unit					
Insurance (%)					
Depreciation (%)					
Interest on Investment (%)					
Taxes (%)					
Total Fixed Charges					
Total Cost per Day in Service					
Total Cost per Mile					
Cost Gasoline per Mile					
Cost Lubricant per Mile					
Total Cost					

Thus at the end of a period of years the owner knows to the fraction of a mill what it costs him to operate each of his trucks. The daily reports always give warning of coming mechanical troubles and by keeping watch of them serious lay-ups may be avoided and the mileage of the car kept up to its normal without mountainous expense.



I—The factory inspector may be present incognito to note the condition of cars

He can tell at a glance how long the car maintains its highest efficiency and exactly where expense begins to pile up, indicating the need of overhaul and replacements. Also by comparison with reports of other years or months covering the same trucks he can tell whether repairs have proved effectual in checking operative expense along lines that appeared excessive.

Undue quantities of fuel or oil used in operation stand out sharply from the normal or average level and excessive speed has its inexorable effect upon the cost of tires and mechanical upkeep. There is no need of an automatic governor to limit the speed of cars if the daily report sheets are read understandingly. A car that is capable of fifteen miles an hour as a normal speed rate shows the effect of twenty miles an hour in its tire consumption and maintenance bills as certainly as the square of the velocity represents the rate of deterioration of mechanism and increase of tire costs.

The use of the motor truck has become very general in the metropolis and has worked a revolution in the transfer and delivery of goods. To a large extent this good work has resulted from the various systems of inspection on the part of the sellers of the cars. The field has been widened enormously and the merchant who does not take advantage of the improvements offered in transportation is in an uncomfortable position.

Several of the big retail establishments, such as R. H. Macy & Company, have adopted the automobile in whole or in part in their transfer and delivery systems. At Macy's, for instance, a whole fleet of small electrics is used for urban delivery. These cars are specially available for crowded city work. They take up small storage space and have proved to be satisfactory for this type of service. But the long hauls—the ones that require stiff mileage, speed and carrying capacity, are taken care of by gasoline wagons of various sizes.

When freight is unloaded from ships or railroad cars the loads are carried to the warehouses of such establishments by large sized gasoline cars. Of course there are some of the docks where the gasoline cars are still excluded on account of fanciful ideas about fire dangers, but in the main it may be said that such regulations are being worked out on a sane basis and the strictures will be eliminated in the course of time. The big trucks back up to the dock or freight yard and receive their loads. The cars are generally of three-ton capacity or larger.

The haul to the warehouses requires less time and the loads carried are proportionately larger than they could be with horse-drawn vehicles. Consequently there is an emphatic saving in this stage of the operation.

The effect quick transit has had upon retail business is strongly illustrated in the greater radius within which deliveries are now made without cost to the customer in comparison with conditions a few years ago.

For instance a big retail store will have one or more distributing depots located far beyond what were formerly the

J—A special point has been made by automobile truck sellers of the education of the users—note the care in loading this White

limits of the free district. In order to take care of this important phase of business the concerns load up big gasoline cars of three-tons capacity or more and make periodic trips from the main warehouses to the supply depots. In one case that was noted by a representative of THE AUTOMOBILE the supply depot was located fourteen miles from the warehouse and each evening the trucks are loaded and sent out with goods destined for delivery on the following day. The cars make the round trip of twenty-eight miles in three hours, transporting three tons of merchandise. Three trips a day could be made with a single truck and the labor represented would be the same as if eighteen horses drawing nine one-ton loads and taking the time of nine drivers had been used.

Twenty-eight miles in a day would be a big labor for a team and certainly the horses do not live that could make two such trips a day under load.

K—Packard trucks like this are constantly under careful scrutiny to see that they are kept at highest efficiency

At the depots the goods are unloaded and sorted for delivery throughout a wide territory and an appreciable amount of such delivery work is done with horse-drawn vehicles.

But another very important portion of delivery work is done by the medium-sized gasoline car. It is pioneer work and requires sturdiness of construction, speed and stability. This is the suburban delivery system. Light, bulky freight such as furniture is handled to a nicety in this way and small parcels, heavy and valuable freight also seems specially adaptable to this form of transportation. Forty, fifty, sixty miles a day are not unusual mileages for the automobiles assigned to this branch of the service. There is nothing easy about it and from the fact that there must be a long barren haul of the full load from the warehouse to the inside delivery limits and another long haul after deliveries have been made, make this kind of service peculiarly trying from the viewpoint of expense. Of course it would be economically impossible with horses as motive power and really represents the modern expansion of commercialism in its simplest form. Natural development of business might account for all the other elements of trade, but in the absence of branch stores, which have not proved perfectly satisfactory as a solution to the problem, the gasoline suburban delivery service has been the means through which the end has been accomplished.

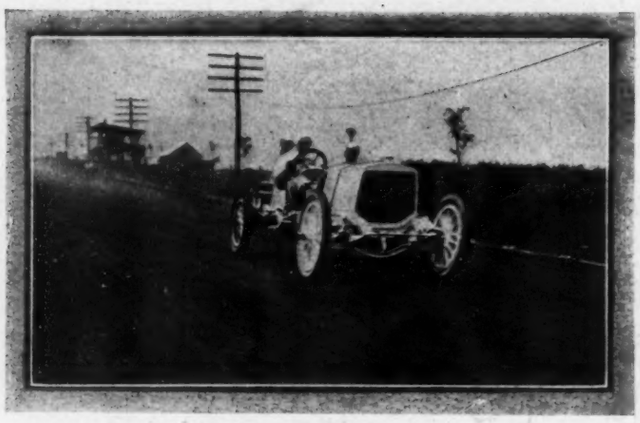
Take a typical case to illustrate how inspection helps the owner to maintain his cars on the road: If an overloaded truck being driven at excessive speed is seen by an inspector, the facts are laid before the owner perhaps a month before the effects of such overload and excess of speed would make themselves apparent in putting the truck out of service.

If the motor acts abnormally or if any one of a dozen different faults are noted in the mechanism or if due care is not apparent in the operation of the truck, the facts properly reported may lead to saving a big repair bill and in keeping the truck on the road without a break for years.

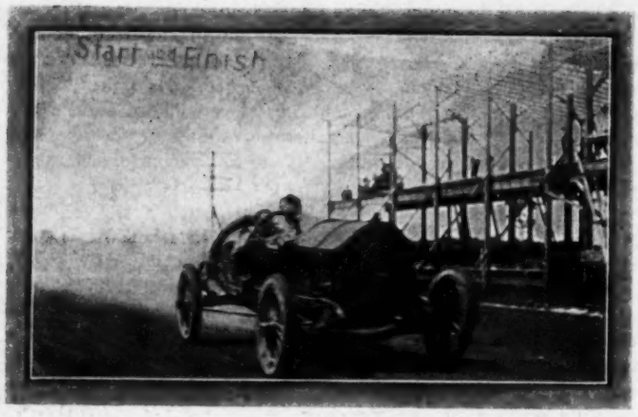
Progress is to be noted in every branch of industry, but nowhere is it more apparent than in the commercial automobile. And now naturally follows the careful inspection of the cars so that this progress may be accentuated. So far the means of accomplishing this end have been vague, general and unorganized, but the trend of the times is all one way and development of the systems of inspection will undoubtedly form an important step in the perfection of the motor truck.

As has been shown, some of the companies have grasped the situation strongly and understandingly. The main object of the truck industry is not now to sell cars, but to sell cars that give service and consequently make a ready market for more cars as the exigencies of trade prepare a place for them to work.

The proof of the pudding lies in the eating thereof, and with the institution of adequate factory inspection after the cars have passed into the hands of purchasers, the universal use of the automobile truck does not seem so very far away.



Lozier, No. 12, Mulford driver, in a fast try-out



Cole, No. 25, with Jenkins at the wheel, going at a 65-mile clip

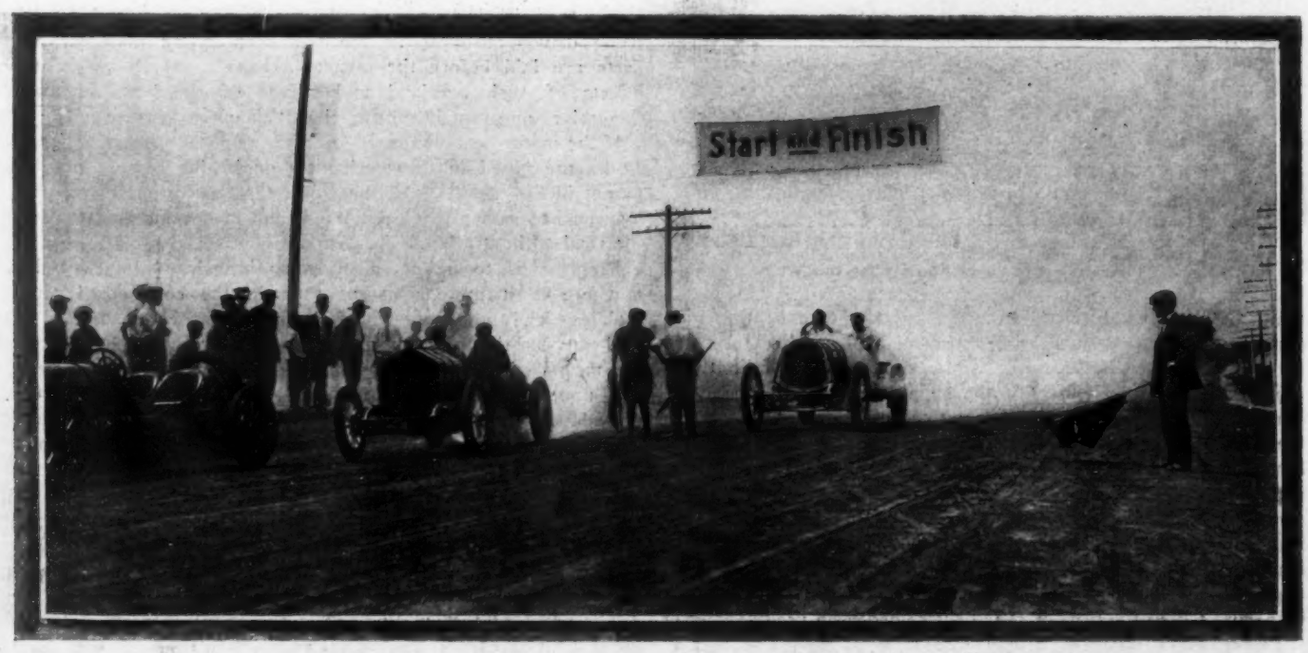
All Eyes Turn Toward Elgin Course

National Stock Car Championships to Be Run

With an entry list of thirty-five, divided among the four big stock car races of the year which will be held over the improved course of Elgin, Ill., on Friday and Saturday, the indications point to fast time and sturdy performance in all the classes. Already one of the entered cars has turned the course at better than a 70-mile-an-hour-clip. Ireland, driver of a Staver, met death on Monday during practice.

CHICAGO, Aug. 22—With a free field, as far as competition is concerned, the Elgin National Stock Chassis races, scheduled for Friday and Saturday, give promise of again proving to be the most important events in Western motordom. There will be four races, as was the case last year.

The cars of the 301-450 class will run for the Illinois Cup at 202 miles on Friday, along with the other two divisions. The 231-300 class for the Kane County Cup at 169 miles, and the 161-230 class for the Aurora Cup at 135 miles. On Saturday the cars of under 600 cubic inches piston displacement will run for the famous Elgin National Trophy, a perpetual challenge cup, which last year was won by the Lozier (Mulford). The big race will



Scene at the tape when the majority of the contestants came out on the course for a series of practice speed trials

Showing the excellent condition of the track in front of the uncompleted press and timers' stands

be at 305 miles and will be the only event on Saturday. The closing of the entries Sunday night found thirty-five names in the box, one more than last year, with twelve in the Elgin National, four in the Illinois, sixteen in the Kane County, and only three in the Aurora.

These are a most representative lot, including fifteen makes—Lozier, Alco, National, Simplex, Pope-Hartford, Mercer, Velie, Staver-Chicago, Cole, Corbin, Colby, Cino, Falcar, Ford and Abbott-Detroit.

All of these are almost certain to go to the post with the exception of the Falcars.

All the turns have been widened, and the only possible criticism is found in a few thank-ye-ma'ams in the back stretch, which are no trouble when traveling at high speed. The home stretch almost is like a boulevard, especially that section between Hornbeek's Turn to Britten's Hill, just west of the grandstand, a one-mile strip which is 54 feet in width, extending from fence to fence and seemingly capable of 90 miles an hour.

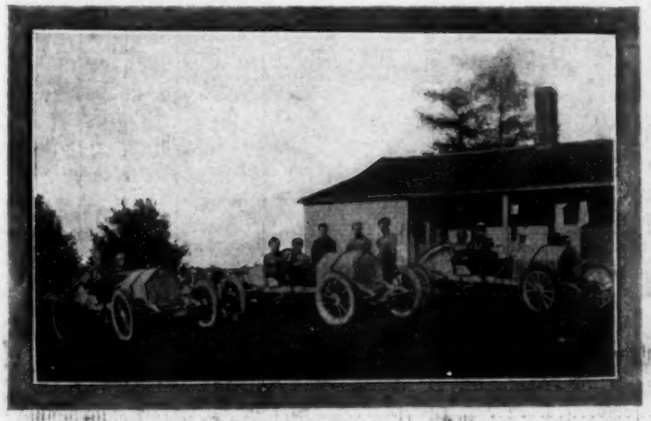
Udina Turn now is 80 feet wide. The races will start at 11 o'clock each day, instead of at 10, as was the case last year, and the course will not be closed until 10.40 A. M., which ought to increase the attendance, for the main difficulty in the past has been to get the spectators seated in time.

Most of them dislike the idea of having to go out to Elgin the night before, and the idea of getting a start from Chicago at 5 A. M. is displeasing to the majority. Now, with all the transportation arrangements that have been made, it will be possible to leave this city as late as 8.30 o'clock and still get up to the course in time.

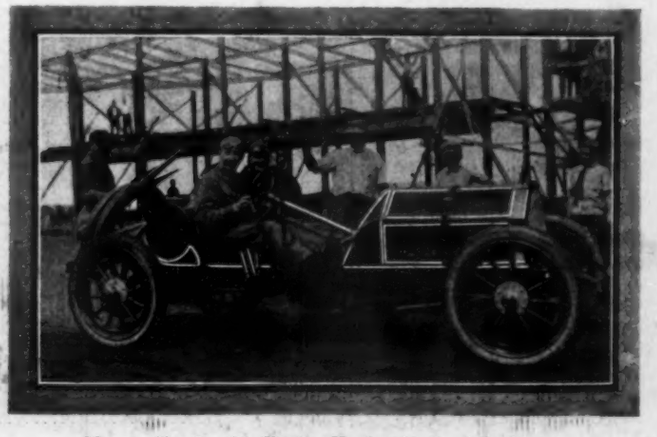
The military arrangements are complete, and for the third time Chicago will have use of the troops. At Crown Point two years ago, the Chicago Automobile Club accomplished the seeming impossibility of taking an Illinois regiment, the First, into Indiana. Last year the Chicago Motor Club had the Eighth Illinois at Elgin, while this year 200 men from the Third Illinois will guard the course the first day, while on the second day the First Illinois Cavalry, a Chicago troop, will be on the job, dismounted, of course.

Practice for the races started last Friday according to schedule. Grant, in the Alco, made the circuit in 8:02, at the rate of a little better than 60 miles an hour, and Aitken, in the National, swung around in 8:11.

On Saturday Mulford was clocked in 7:13, better than 70 miles an hour. His second lap was only 2 seconds slower. Aitken in the National was credited with 7:23 and 7:22; Meyers' best time was 7:36; Zengel, another National driver, did 7:35



Staver team in front of its quarters—Nikrent, 16; Robillard, 25; Monckmeier, 27



Mercer, No. 9, with Hughie Hughes in the driver's seat

and 7:56; Herr, the fourth man on the blue team, did 7:50 and 7:55; Hartman in the Alco turned 7:55 and 7:58, Grant did 7:42 and 7:47, while Hughes showed the pace of the Mercer by clocking 7:47 and 7:50.

On Monday Grant opened the throttle a bit for 7:43, while Wishart showed a bit of Simplex speed for the first time, being blocked in 7:41. His team mate, De Palma, was contented with a slower lap, his best time being 7:52; Aitken was recorded in 7:48, Hughes in 7:45, and Hartman in 7:43.

The following assignments of numbers have been made:

Elgin National: 1, Alco, Grant; 2, National, Zengel; 3, Pope-Hartford, Buck; 4, Simplex, Wishart; 5, Alco, Lee; 6, National, Aitken; 7, Alco, Hartman; 8, Cino, Raimey; 9, Mercer, Hughes; 10, Cino, Burt; 11, Simplex, De Palma; 12, Lozier, Mulford.

Illinois Cup: 1, National, Herr; 2, Velie, Jeffkins; 3, National, Merz; 4, Velie, Stickney.

Kane County Cup: 11, Cino, Burt; 12, Mercer, Barnes; 14, Corbin, Maisonville; 15, Mercer, Hughes; 16, Staver-Chicago, Nikrent; 17, Falcar, ——; 18, Colby, Ogren; 19, Falcar, ——; 20, Colby, Pearce; 21, Cole, Morris; 22, Colby, Armstrong; 23, Falcar, ——; 24, Cole, Jenkins; 25, Staver-Chicago, Robillard; 26, Cino, Raimey; 27, Staver-Chicago, Monckmeier.

Aurora Cup: 31, Abbott-Detroit, Robbins; 32, Ford, Kulick; 33, Abbott-Detroit, Roberts.

ELGIN NATIONAL TROPHY RACE, DISTANCE 305 MILES, FOR STOCK CHASSIS 600 CUBIC INCHES AND UNDER

Car.	Driver.	Model Year.	Number of Cylinders.	Bore.	Stroke.	Type of Cylinder.	Lubrication.	Pump.	Radiator.	Fan Drive.	Ignition.	Clutch.	Friction Surface.	Gearset.
Lozier	Ralph Mulford	1911	4	5⅜	6	T	Mechanical	Centrifugal	Cellular	Spiral Gear	Bosch two-point	Multiple Disk	Steel and Steel	Selective A'dships
National	John Aitken	1911	4	5	5½	T	Crankcase Circulating	Centrifugal	Cellular	Belt	Splitdorf two-point	Cone	Leather & Cork Ins't	Selective A'dships
National	Len Zengel	1911	4	5	5½	T	Crankcase Circulating	Centrifugal	Cellular	Belt	Splitdorf two-point	Cone	Cork Insert	Selective A'dships
Alco	Harry Grant	1909	6	4¾	5½	T	Crankcase Circulating	Centrifugal	Cellular	Belt	Single, Bosch	Multiple Disk	Steel and Bronze	Selective
Alco	Frank Lee	1911	6	4¾	5½	T	Crankcase Circulating	Centrifugal	Cellular	Belt	Bosch two-point	Multiple Disk	Steel and Bronze	Selective A'dships
Alco	Harry Hartman	1911	6	4¾	5½	T	Crankcase Circulating	Centrifugal	Cellular	Belt	Bosch two-point	Multiple Disk	Steel and Bronze	Selective A'dships
Simplex	Ralph DePalma	1912	4	5¾	5¾	T	Mechanical	Centrifugal	Cellular	Flywh'l	Bosch two-point	Multiple Disk	Steel and Steel	Selective A'dships
Simplex	Spencer Wishart	1912	4	5¾	5¾	T	Mechanical	Centrifugal	Cellular	Flywh'l	Bosch two-point	Multiple Disk	Steel and Steel	Selective A'dships
Pope-Hartford	Dave Buck	1911	4	4¾	5½	Overhead valves	Mechanical Splash	Centrifugal	Horizontal Tube	Belt	Splitdorf double	Cone	Leather Cork Insert	Selective A'dships
Mercer	Hugh Hughes	1911	4	4⅝	5	T	Crankcase Circulating	Centrifugal	Cellular	Belt	Bosch double	Multiple Disk	Steel and Steel	Selective A'dships
Cino	Andy Burt	1911	4	4⅝	5	Valve in head	Mechanical	Centrifugal	Vert. Tube	Belt	Remy two-point	Cone	Leather Cork Insert	Selective A'dships
Cino	John Raimey	1911	4	4⅝	5	Valve in head	Mechanical	Centrifugal	Vert. Tube	Belt	Remy two-point	Cone	Leather Cork Insert	Selective A'dships

AURORA CUP, DISTANCE 135 MILES, FOR STOCK CHASSIS, 161-230 CLASS

Abbott-Detroit	MortimerRoberts	1911	4	4	4¼	L	Circulating Splash	Centrifugal	Cellular	Belt		Multiple Disk	Steel and Steel	Selective A'dships
Abbott-Detroit	A. M. Robbins	1911	4	4	4¼	L	Circulating Splash	Centrifugal	Cellular	Belt		Multiple Disk	Steel and Steel	Selective A'dships
Ford	P. Kulick	1911	4	3¾	4	L	Circulating Splash	Th'rmo Siph.	Tubular	Belt	Ford Magneto	Multiple Disk	Steel and Steel	Planetary

ILLINOIS TROPHY, DISTANCE 202 MILES, FOR STOCK CHASSIS, 301-450 CUBIC INCHES

National	Charles Merz	1911	4	5	5½	T	Crankcase Circulating	Centrifugal	Cellular	Belt	Splitdorf two-point	Cone	Leather & Cork Inser.	Selective A'dships
National	Don Herr	1911	4	5	5½	T	Crankcase Circulating	Centrifugal	Cellular	Belt	Splitdorf two-point	Cone	Leather & Cork Inser	Selective A'dships
Velie	J. H. Stickney	1912	4	4½	5¼	L	Crankcase Circulating	Centrifugal	Vert. Tube	Belt	Remy Dual	Multiple Disk	Steel and Steel	Selective A'dships
Velie	R. Jeffkins	1912	4	4½	5¼	L	Crankcase Circulating	Centrifugal	Vert. Tube	Belt	Remy Dual	Multiple Disk	Steel and Steel	Selective A'dships

KANE COUNTY TROPHY, DISTANCE 169 MILES, STOCK CHASSIS, 231-300 CLASS

Staver-Chicago		1912	4	4⅜	5	T	Automatic Splash	Centrifugal	Vert. Tube	Belt		Multiple Disk	Steel and Steel	Selective A'dships
Staver-Chicago		1912	4	4⅜	5	T	Automatic Splash	Centrifugal	Vert. Tube	Belt		Multiple Disk	Steel and Steel	Selective A'dships
Staver-Chicago		1912	4	4⅜	5	T	Automatic Splash	Centrifugal	Vert. Tube	Belt		Multiple Disk	Steel and Steel	Selective A'dships
Cole	J. Jenkins	1911	4	4½	4½	L	Splash	Centrifugal	Hon.-comb	Belt		Cone	Leather & Cork Insert	Selective Unit with motor
Cole	Gaston Morris	1911	4	4½	4½	L	Splash	Centrifugal	Hon.-comb	Belt		Cone	Leather & Cork Insert	Selective Unit with motor
Corbin	A. Maisonville	1909												
Colby	W. H. Pearce	1912	4	4¼	5¼	L	Crankcase circulating	Centrifugal	Sq. tube	Belt		Cone	Therm. & Cork Insert	Selective A'dships
Colby	H. W. Ogren	1912	4	4¼	5¼	L	Crankcase Circulating	Centrifugal	Sq. tube	Belt		Cone	Therm. & Cork Insert	Selective A'dships
Colby	A. Armstrong	1912	4	4¼	5¼	L	Crankcase Circulating	Centrifugal	Sq. tube	Belt		Cone	Therm. & Cork Insert	Selective A'dships
Cino	John Raimey	1911	4	4⅜	5	Valve in head	Mechanical	Centrifugal	Vert. tube	Belt	Remy two-point	Cone	Leather & Cork Insert	Selective A'dships
Cino	Andy Burt	1911	4	4⅜	5	Valve in head	Mechanical	Centrifugal	Vert. tube	Belt	Remy two-point	Cone	Leather & Cork Insert	Selective A'dships
Mercer	H. Hughes	1911	4	4⅜	5	T	Crankcase Circulating	Centrifugal	Cellular	Belt	Bosch Double	Multiple Disk	Steel and Steel	Selective A'dships
Mercer	W. F. Barnes, Jr.	1911	4	4⅜	5	T	Crankcase Circulating	Centrifugal	Cellular	Belt	Bosch Double	Multiple Disk	Steel and Steel	Selective A'dships
Falcar	Speed type—not	qualified												
Falcar														
Falcar														

Problems of Steering Mechanism

Analysis of Factors Governing Correct Design

In this article, reprinted from the Motor Trader, A. Cattaneo discusses the problems which affect the steering mechanism of the automobile, with some notes especially referring to the correct placing of the tie-bar and to the power lost by want of parallel wheel tracking.

FOR a theoretically correct steering it is imperative that the axes through the wheel spindles should radiate from a point situated on the back axle, as shown at D, in Fig. 1.

FIRST ESSENTIAL FOR A PIVOT STEERING—Fig. 1 shows this when the front wheels are moved from position I into position II. It has, however, been found that the practical fulfilment of this condition would require a prohibitive number of links or other complications, and a theoretically correct steering is, therefore, never met with.

The designer of the steering arrangement has, consequently, the following problem to solve. To connect in the simplest manner the front wheels in such a way as to obtain the greatest approach to the theoretical condition. Suffice it here to state that the quadrilateral style, either as an interior or exterior quadrilateral, is now universally used. The simplicity of this arrangement is one of its strongest points, and when carefully designed it may be made to fulfil all that is required of it as a substitute for unpractical devices. Unfortunately, however, its arrangement on many modern self-propelled vehicles points to the fact that the necessity for accuracy in laying out the quadrilateral is not fully appreciated, nor is its general design often sufficiently understood and considered.

ACCURACY IN TRACKING—In consequence of this inaccuracy the front wheels do not automatically adjust their angularity when negotiating a bend, but instead are compelled to slide over the road, with a corresponding detrimental effect on the life of the tires. There being more obvious factors responsible for the wear of the tires, the amount really attributable to the inaccuracy of the steering is liable to be underrated, if not overlooked altogether; and this, no doubt, accounts for the fact that hardly any improvement is attempted in the design of the steering connections.

On checking the accuracy of the steering of many cars it will be found that, by a very slight alteration of the quadrilateral, in almost every instance the degree of accuracy could be improved, and the life of the tires and the comfort in steering correspondingly increased.

HOW THE QUADRILATERAL IS FOUND—Fig. 1 shows that for an angle a of one of the front wheels, their corresponding axes intersect each other at a point D on the prolongation of the back axle. This only holds true for theoretically correct steering; practically such points as D will be located on a curve, enclosing with the back axle a surface which can be taken as a criterion for the accuracy of the steering, and of the extent to which this will tax the life of the front tires. Unfortunately, this method is of no practical value; the process of finding the axes of the wheels corresponding to a certain angle being a lengthy one; moreover, for a certain range of lock, the intersection of these axes would lie quite outside the drawing board, unless a very small scale be employed, and the accuracy of the result correspondingly impaired.

A little mathematical consideration will show how to evade this difficulty, besides giving a practical mean for comparing different results with each other and discussing them. Hence, referring to Fig. 1, let b equal the wheelbase, and 2d equal the fixed distance between the pivots A and B. Suppose, however, that the front wheels are moved from position I into position II, then carry the corresponding angle a of wheel A on the right-hand side of A; obtain, as shown, the point E on B D, and draw E G perpendicular to A B. Then the triangle A G E is similar to triangle A C D. By making the center F of the front axle the origin of a system of co-ordinates, it is:

$$y : b = (d-x) : A C \qquad A C = b\,(d-x) : y$$

triangle B G E is similar to triangle B C D; therefore:

$$y : b = (d + x) : (2d + A C), \text{ or}$$

$$y : b = (d + x) : [2d + b\,(d-x) : y].$$

After making the necessary operations we find

$$2\,dy = 2\,bx, \text{ or } y = (b : d)\,x,$$

which is the equation of a straight line L L going through the center F of the front axle, and making with it an angle e; so that

$$\tan e = b : d.$$

It is obvious that this relation holds true for any value of the angles a and c; therefore, the line L L contains all the points obtained in the same manner as point E. This, again, is only theoretically correct; practically such points as E lie on a curve, including with L L a surface which can again be taken as a criterion of the accuracy of the arrangement of the quadrilateral.

AN ERROR IN STANDARDIZATION—The diagram shows also in an obvious manner that the very common practice of using a standard steering arrangement for different types of car, although very convenient for the manufacturer, should be departed from on account of the increased inaccuracy involved.

For illustration of this it is sufficient to refer to Fig. 2. If curve 1 corresponds to the best results obtainable with a certain quadrilateral on a 11-ft. wheelbase car, by reducing this length to 9 ft. the angle e is also correspondingly reduced; that is, line L L moves farther away from the curve which, of course, by retaining the old quadrilateral remains the same, and the increased surface lying between the new line L L and the curve shows to which extent the accuracy of the steering has been reduced.

Again, suppose the front axle and the wheelbase to be given. The first one only needs to be shown in the drawing. Through its center draw a line L L under an angle e, so that

$$\tan e = b : d.$$

Assume a certain quadrilateral, *e. g.*, that marked 1; move one of the wheels (for sake of argument, A) at different angles to the left, one of these being angle a; carry this angle inside by drawing the line A Q; find the position S of the lever r, and by means of the tie rod l determine the corresponding angle c of wheel B. Produce the axis of this new position of wheel B until it intersects the line A Q at a point P. This process applied to a few different angles will supply as many points; by joining which a curve—such as the one marked 1—is obtained, approaching more or less to line L L, according to the accuracy obtainable with the quadrilateral in question. It is, of course, only necessary to obtain one branch of the curve; for instance, the one lying inside the front axle, and corresponding to a movement to the left, as for an equal lock to the right the curve is symmetrical to both the front axle and line L L.

A PRACTICAL DEDUCTION—The advantages of this method are

too obvious to require comment. The arrangement can be sketched out almost to full size, and, therefore, very accurately. By slightly varying either the length or the angularity of the steering levers r, a quadrilateral can easily be found giving the greatest accuracy obtainable.

Again, by comparing curve 4 with curve 1, it will be noticed at once that quadrilateral 4 gives greater accuracy than quadrilateral 1; the latter being obtained in the usual manner by setting the lever arms r at such an angle that they intersect on the center of the back axle. This method of laying out the quadrilateral should, therefore, be discarded, and both steering arms be made to intersect in front of the back axle and at a distance from it about equal to the fixed distance between the pivots of the steering wheels.

The correct position of the point of intersection cannot be given, as the ratio of wheelbase to length of front axle is not constant; but by assuming different positions for the point of intersection of the steering levers, and by plotting the corresponding curves, it will be an easy task to see which arrangement gives the best results. The diagram will also throw light on the important question whether an interior or an exterior quadrilateral should be adopted. The latter arrangement is gaining favor among the leading makers, and, were its advantages fully understood, one would wonder why the interior quadrilateral is still adhered to.

Correct Position of Tie-Bar—By comparing curve 1 with curve 2 (Fig. 2) it will be seen that with the same length and angularity of the steering levers the "in-front" disposition gives not only mechanical advantages, but also a markedly greater accuracy, due to the increased length of the tie-rod. It can easily be proved that for a given interior quadrilateral an exterior one can be found to realize better the theoretical condition for correct steering. There are other points that speak in favor of the "in-front" arrangement; so many, in fact, as to totally outweigh whatever reason may be urged in favor of the rear placing.

The advantage of having the tie-rod under tension is not a trivial one. The strength of the material is better made use of; but the rod should not on this account be reduced in weight, as the peculiar conditions under which it transmits power from the steering wheel require—in the case of an exterior quadrilateral—a larger section for the tie-bar than is permissible with the interior one. This is readily accounted for by bearing in mind that the coupling bar is to be considered as a connecting rod in which buckling stresses are set up, and, therefore, the strength of its section diminishes inversely with the square of its length. But even in this respect the "in-front" position scores. It permits a strong, straight bar to be used, whereas with the interior quadrilateral the middle part of the tie-rod, which is, unfortunately, also the dangerous section, is very often to be found bent, or cranked, to clear the engine basechamber, or some other part, with an obvious detrimental effect on the strength of the arrangement.

The "in-front" position of the tie-bar facilitates, to a great extent, the erecting of the steering connections, and is surely the best from the point of view of upkeep, for it allows the joints to be easily inspected and their lubrication to be properly attended to, and also permits the tie-rod itself to be easily removed and repaired.

By the opposed or rear position of the tie-rod and steering arms it is claimed both are protected, so that the steering would not be disabled in case of a collision. This sounds quite reasonable, and it is as a matter of fact the only good point in connection with the interior quadrilateral.

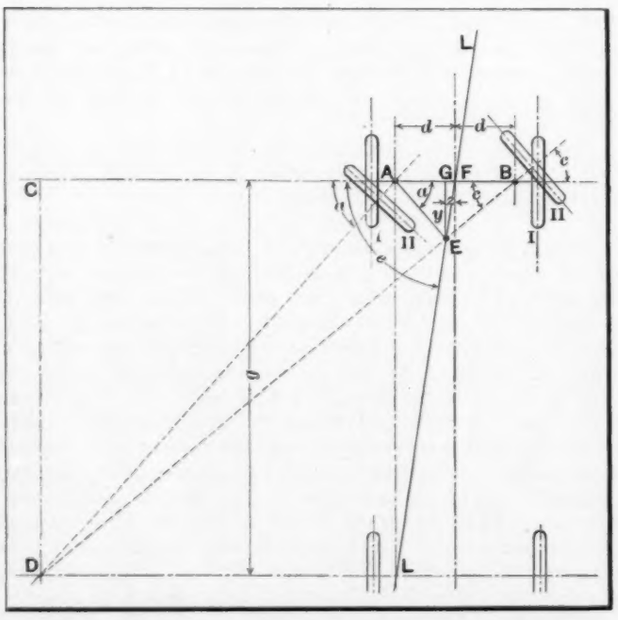


Fig. 1—Illustrating the theory of a correct steering design

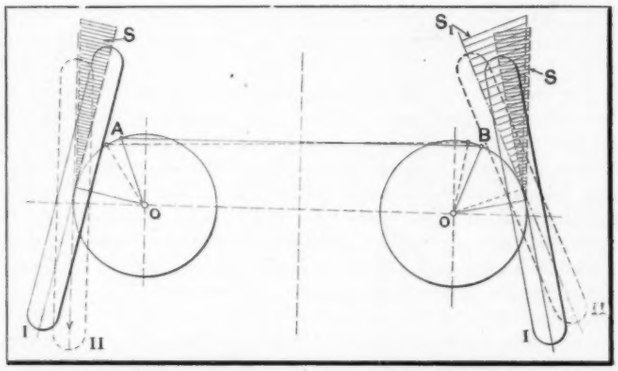


Fig. 4—Illustrating compromise setting for a racing car

Here it may be opportunely remarked that, by placing the tie-rod in front, it can also be moved farther away from the ground than is the case with the interior arrangement, and any accident that would then affect the tie-bar would most probably also injure some other part, if not disable the car.

It is also claimed for the rear placing of the tie-rod that the absence of links and levers enhances the good appearance of a car, when viewed from the front. It is undoubtedly better in many instances, whether for esthetic or other reasons, if the front axle be made to screen some of the fancy shapes of the crooked tie-rod one sees, but, on the other hand, the critic will fail to see how the elegant and graceful lines of a modern chassis could be spoiled by a neat and straight rod placed symmetrically both to the front axle and frame.

Finally, it is also urged against the exterior quadrilateral that, by its adoption, the ends of the steering levers may come dangerously near the spokes of the wheels. This point should not be overlooked by the designer, and before definitely adopting a quadrilateral he should make himself sure that it gives the greatest accuracy with a reasonable amount of clearance between the spokes and the ends of the steering arms, for each angle of the front wheels, within the range of lock.

Angularity in Steering Wheels Setting—For another species of practice retained by a few designers a plausible explanation still obtains. I refer to the practice of setting the steering wheels out of parallel, so that they converge at a point in front and on the axis of the car. The angularity is very small, the angle included by both wheels being no more than from five to seven degrees; and this undoubtedly accounts for this practice remaining often unnoticed or undetected.

The modern motor vehicle is admittedly designed on compromises. Some of these nearly give ideal conditions, while others would barely stand a close investigation. Regarded from this standpoint, it will serve to examine the behavior of both systems

of setting the steering wheels, and with a view to ascertain whether it would not be possible to arrive at a compromise which would embrace the advantages of both systems, and reduce, if not eliminate, their respective drawbacks.

PARALLEL VS. ANGULAR SETTING ANALYZED—Referring to Fig. 3, both wheels, which are parallel, are shown with the quadrilateral O A B O in the neutral position I, while the car itself is supposed to be traveling in the direction of the arrow, overcoming a certain resistance R acting in the axis of the vehicle and equally distributed between the two wheels. These two forces, however slight they may be, being transmitted through spindle and lever to the tie-rod, and the two components lying in its direction, are obviously neutralized.

Let us now suppose that the wheels be moved from position I into position II, and the same resistance R be acting again in the axis of the vehicle—both these forces R are supposed equal, the angles to which the wheels are locked being taken very small; they, therefore, need not be specially inquired into, and can be represented by the length R.

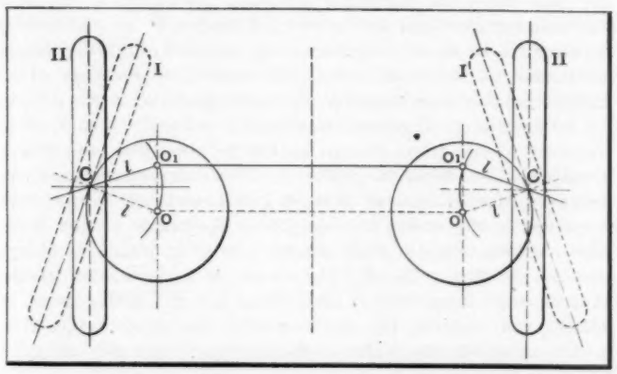


Fig. 5—Illustrating a theoretically correct setting

It is easy to resolve this force into two components, one of them in the direction of the wheel axle, and taken up by the steering pivot, and the other at right angles to the first. If, for the sake of simplicity, the wheels are supposed not to be splayed, and, moreover, the distance between center of wheel and center of pivot be equal, the length of steering arm (the component of R at right angles to the spindle) will be found again at the end of the steering arm and perpendicular to it. Here this component is resolved into two others; one in the direction of the steering arm, and taken up by the pivot, the other lying in the direction of the tie bar, tending to pull this over the left. Let this component be called P.

For the steering to be in a condition of equilibrium, it is obviously imperative that this force P be destroyed by another equal force acting also on the tie-bar, but in the opposite direction. By applying the procedure just described to the other wheel, whose position is determined through the assumed quadrilateral, it will be found that not only is the corresponding component force P_1, in the tie rod, different from P, but, and this is the serious point, it is also to a markedly smaller amount. In this connection it should be pointed out that for the purpose of showing better this peculiar behavior, the quadrilateral has an exaggerated angularity, and the angles of lock shown could only be obtained with a considerable movement of the steering wheel. Nevertheless, the diagram shows that the arrangement is not in a state of stable equilibrium.

WHY WHEEL WOBBLING OCCURS—With an accurate quadrilateral, smaller lock and sufficient splay of the wheels, the difference P, P_1, will certainly be reduced, but without it being possible to entirely eliminate it. As has already been pointed out, the peculiarity lies in the fact that, unfortunately, P is always greater than P_1; or, in other words, when the wheels are moved a certain angle a tendency is also created to automatically increase the initial lock. This was very apparent with the earlier cars.

The advent of irreversible steering gear was a step in the right direction, but did not affect this tendency by which the wobbling of the wheels, and not a few so-called mysterious accidents, can easily be explained. If, when riding over rough roads, or in meeting an obstacle, the impact be strong enough to cause the particular wheel to assume a certain angle (the play at the joints and the springs interposed in the steering connection will always allow a wheel to give a bit), the resistance then creates a tendency to follow up the lock, and this will really follow until the buffer spring at the ball joint of the steering arm is fully compressed. Hence, if then, for some reason or other, the resistance diminishes, the fully compressed spring "shoots" both front wheels back in the neutral position, and, perhaps, over it, and the process is ready to begin again. If such resistance be not reduced the driver will be called upon to rectify the angularity of the wheels.

Defective Tracking Causes Large Power Loss.

In measuring the tractive efficiency of a motor car no account is taken of any formula of the power absorbed by the front wheels, these being taken as running parallel, i.e., tracking correctly. If, however, this condition be not fulfilled, there will be a large additional loss; the efficiency might be as high as could be desired, and yet, under otherwise the same conditions, the behavior of the car on the road would make but a poor show as compared to the one of another car of lower efficiency and faultless setting of the front wheels. In the case of a 40 brake-horsepower car without having met with an accident necessitating the fitting of new front wheels, it was found that the highest speed obtainable had fallen from 50 to 42 miles an hour. The engine had been untouched, and the transmission turned as smoothly as before.

When, however, the front wheels were tested for parallelism they were found to be "out" by 4 degrees. At first, so apparently small an error was considered too trivial to be reckoned a possible cause, but on plotting the deviation graphically it was found that at 2 degrees from being parallel 3 horsepower was absorbed, increased to 6 horsepower at 4 degrees and 9 horsepower at 6 degrees on each plotting at 50 miles an hour with a pro rata scale for the lower speeds. The moral, therefore, is obvious.

A RACING CAR COMPROMISE—A solution of the angularity dif-

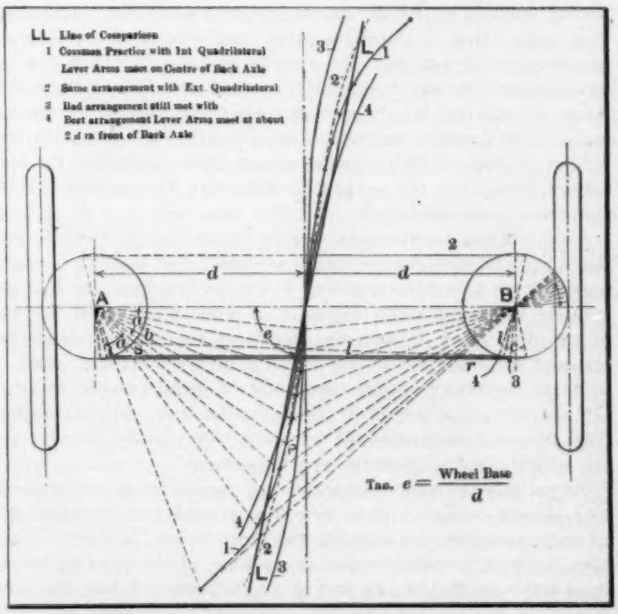


Fig. 2—Comparative graphs of types of steering design

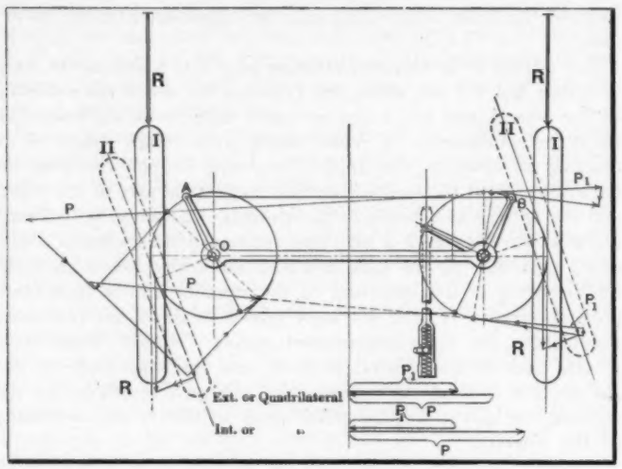


Fig. 3—Illustrating parallel vs. angular wheel setting

ficulty as it concerns racing cars is shown in Fig. 4. It will readily be seen that, owing to the wheels being not parallel their motion is of a mixed rolling and sliding character. When driving straight along with the wheels in the neutral position, the amount of work corresponding to the sliding motion is obviously equal for both wheels, being mainly dependent upon the angle they enclose. It can, therefore, be assumed proportional to the surfaces S, S. If the wheels be moved from position I into position II, the work S of the "leading wheel" is reduced from S to zero, while for the other it increases from S to S1, that is to say, for a certain lock the off-side wheel has to overcome a much greater resistance; it opposes, therefore, to an increase of the angularity, and tends to bring back the wheels to their neutral position. This steering is positively stable; a shock which would produce a certain lock at one wheel has also to overcome the increased work of friction of the other wheel; that is, the force of impact will never produce any considerable angle at one wheel, and even if that could happen the steering would at once right itself. A car, when going at a good speed, would always keep its direction, even in case the steering arrangement should become valueless.

A Drawback and a Deduction.—As it has been pointed out before, this setting has the great drawback of taxing the life of the tires to an almost alarming extent, on account of the sliding motion to which the wheels are subjected. Moreover, their angle being small, unless great care is taken in erecting, the angularity will probably not result the same for both wheels, which means increased wear of tires and unstability of steering. Some makers use for the setting a kind of jig with correspondingly more accurate results. It would seem, therefore, that the correct setting of the steering wheels should combine the true rolling motion of the parallel system with the stability of the converging arrangement.

An Effective Compromise—Referring to Fig. 5, it will be seen that this condition may be easily attained. Let C O O C represent a front axle corresponding to the neutral position I of the wheels; these latter converging at a point in front of the car. If the distance C C and the length of the steering lever are constant, and both wheels are made to turn about the points C C as their respective centers, the points O will have to move to O1, and a new position C O1 O1 C for the front axle is obtained. This not only allows for the wheels to run parallel, but has also the stability of the converging arrangement.

Recently some makers, appreciating the advantages of the setting shown in Fig. 5, have accordingly modified the front axle of their new cars by adopting the form shown in Fig. 6. It is easy to prove graphically that this setting of the steering wheels is as stable as that shown in Fig. 4. To carry out this, the same procedure may be applied as was done for the arrangement shown in Fig. 3.

It will be found that for no matter at whatever lock to the left, the force P1 is always greater than P; that is to say, there is a tendency for the wheels to return in their neutral position whenever, for some reason or other, they have deviated from it. The common practice of splaying the wheels reduces the strains in the pivot, may even eliminate them altogether under certain circumstances; but as the length of the steering levers is usually greater than the distance between the center of the wheel and the pivot, the stresses in the tie rod are almost always present.

Another Factor in Wheel Wobbling—The circumstance that wobbling is apparent to a greater or lesser degree on different cars points conclusively to the fact that, while unable to entirely avoid the causes of the unsightly occurrence, some careful designers have, however, succeeded in reducing to a minimum the unsteadiness of the front wheels, improving thereby not only the appearance and the running of the vehicle, but also the wear and life of the tires and steering connections. The remedy is so simple and obvious that no doubt it would be generally adopted, were the designers of motor cars only to give this point the proper amount of thought and consideration, bearing in mind that not only ought the steering to be made a mechanical and accurate job, but also that its connections should be so contrived as to minimize whatever disturbance may arise through the floating suspension of the front axle. The neglect on the part of designers to take these disturbances into consideration when laying out a steering arrangement is certainly a fruitful cause of the wobbling of the front wheels, as will be clearly shown by even a superficial examination of Fig. 7. This diagram represents the generally adopted method of front axle suspension, by which the front end of the spring is hinged at a fixed pivot on the frame, while the rear end is suitably shackled, so as to permit the elongation of the spring to take place only in a rearward direction. If, now, the riding over an obstacle causes the spring to be deflected from form I, say, into form II, the front axle will no more remain in the same vertical plane, but will obviously follow the movement of the spring to which it is rigidly attached.

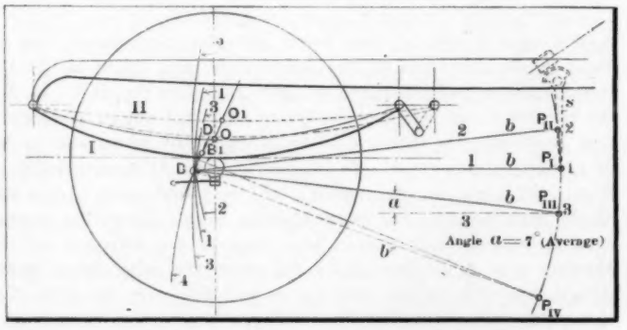


Fig. 7—Illustrating imperfect design as a cause of wobbling steering wheels

The path of this movement will be a certain curve, dependent upon the vertical displacement of the wheel, and upon the corresponding deflection, that is, elongation, of the spring. Let O be the center of the spring when in the neutral position, I, and O1 that corresponding to position II; then O and O1 are obviously two points of the curve referred to. For the sake of simplicity suppose these points O and O1 to be connected through a straight line, which, instead of the theoretical curve, is now taken to represent the path along which the centre O of the spring moves, when this latter has been deflected to a corresponding amount.

The front axle evidently partakes of the same movement; and so would the spherical knob B—supposing the rod b to be removed—displacing itself along a straight line BD, parallel to OO1. If the steering arrangement marked I is considered, it will be readily seen that on account of the immobility of point P1 the only possible movement of the ball B is along a circle 1, struck from P1, with b as radius, and passing through the centre

of B; in other words, the steering knob B alters its relative position to the front axle to an amount represented by the surface enclosed between the arc of circle 1 and line BD. It is obvious that this displacement causes the wheel to be moved sideways to an amount corresponding to the shaded surface enclosed by the theoretical and actual parts of ball B. When the spring returns to its neutral position the reverse proceeding takes place, and the wheels are automatically set straight again.

Effect of Front Spring Deflection on the Steering Gear—It is easily conceivable that if a vehicle is too lightly sprung the riding over an ordinary road will cause the springs to be in an almost perpetual state of oscillation, resulting, as has been shown, in wobbling of the front wheels.

The buffer springs, interposed at the point P1 between the steering arm a and the connecting bar b, may under circumstances permit the latter to "go back" a small amount, with the consequence that the ball joint B will no more describe the circle 1, but moves instead along a new curve, lying between circle 1 and line BD, and approaching more or less to this last-named, according to the stiffness of the cushioning springs referred to. The purpose these buffers are intended to serve requires them to be fairly strong; it seems, therefore, that the best solution of the difficulty would be to find such a position for the point P1 that the circle struck from it as centre, and with b as radius, would practically coincide with the theoretical line BD. It is fairly obvious that this condition will be fulfilled if the point P1 lies on a line drawn normally to the centre of the path, as shown for point P4.

In this connection it is interesting to point out that some makers, by adopting for the connecting bar the disposition marked 2 (Fig. 8) not only seem to forget the requirements of a correct steering, but also to be positively striving to increase an unfortunately unavoidable inaccuracy. As it can be readily seen in the diagram, the higher point P II is in relation to B the greater will be the discrepancy between the theoretical and actual paths of the knob B, and the greater, therefore, the tendency to wobble in the front wheels. The point P4, obtained in the manner shown

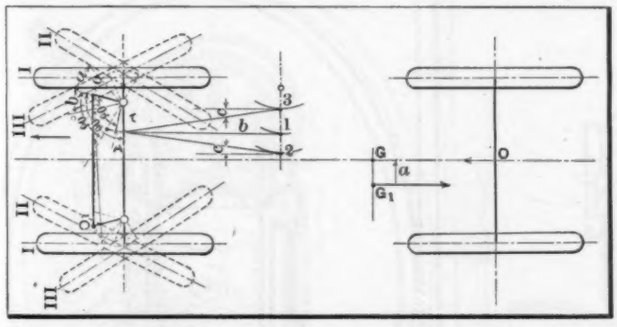


Fig. 8—Illustrating the effect of a faulty distribution of weight

in Fig. 7, is the only position for the lower end of the steering arm a, for which the discrepancy referred to can be neglected.

To avoid wobbling it is, therefore, imperative that point P III should approach P IV, as close as practically possible, a condition which can be translated into practice only by placing the connecting bar at an angle, raising towards the front of the vehicle, as it is shown for the arrangement marked 3. The increased length of the steering arm a that would result from this disposition can easily be obviated by placing the ball joint B above the front axle. The angle included by the connecting bar b and the horizontal axis varies on different cars, but an average value of 7 degrees has given satisfactory results.

Effect of Faulty Weight Distribution—Fig. 8 shows also how a faulty distribution of weight may, under circumstances, give rise, if not actually to wobbling, at least to some disturbances in the steering of the car. As a vehicle moves along, overcoming its own inertia, this latter can be rightly considered as a force T applied at the centre of gravity G of the vehicle, and

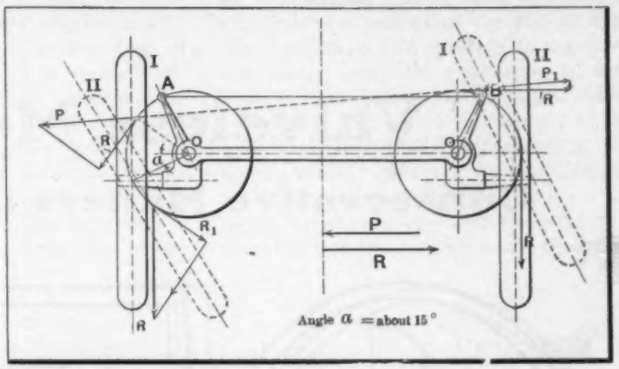


Fig. 6—Illustrating a modification of the type shown in Fig. 8

acting in the opposite direction to that in which the car is moving. It will be seen that if care is not taken to equally distribute the weight, the center of gravity will be no more on the axis of the vehicle, but on one side of it, at a certain distance a. At this new centre of gravity G1 the force of inertia is now applied, while the power is still acting at the two back wheels, or which amounts to the same, at the point O. A couple whose lever arm is a is thus produced, tending to pivot the whole car round its hind wheels; the front wheels will therefore be inclined to slide to the left, resisting power against this tendency through their friction to the ground.

As soon as the engine is declutched the force of inertia instantaneously reverses its direction, and the front wheels are now inclined to slide to the right. It is easily conceivable that thus a tendency may arise to make both front wheels strike to the right and to the left, which tendency, by bad workmanship and undue amount of play and wear, may also result in wobbling of the front wheels.

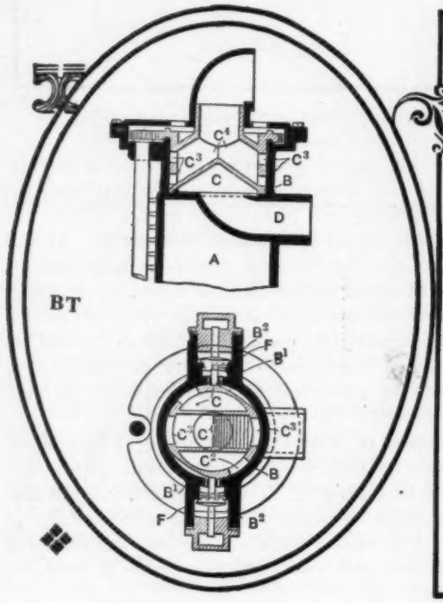
Accurate Registering of Wheel Lock.—Another very important condition that every well-designed steering should fulfil is that the steering wheel should be turned to the same angle for an equal lock to the right and to the left of the steering wheels.

Referring to Fig. 8 again, it will be seen that for the neutral position I of the steering wheels, the corresponding position of the quadrilateral is O1 O1 A1. For a lock III to the left, the steering lever A moves a certain amount corresponding to an angle b, while for exactly the same lock II to the right, the angle to which A will have to move is undoubtedly greater, and in our case equals a. It is assumed, as required by the condition mentioned before, that for both locks the point 1 of the steering arm displaces itself the same amount to the right and to the left, its extreme positions being therefore symmetrically placed in relation to the axis of the steering arm when in neutral position. The point A of the connecting bar b and steering lever must, however, make such a movement as to correspond to an angle b in one case and a in the other. It is therefore apparent that the situation of the point A requires careful consideration, although it is a very easy matter to determine graphically the exact position of it. It will be found that if the connecting bar b can be disposed parallel to the axis of the car good results are obtained by placing the lever A at right angles to the steering lever of the quadrilateral; in case the point A of the steering lever is assumed in between the central axis of the vehicle and the point 1 of the steering arm, the angle included by A and the lever of the quadrilateral should be taken equal 90 deg. less angle a, made by the connecting bar with the center line of the car; if, on the contrary, the point A is situated on the other side of the steering arm, the angle between the two levers above referred to ought to be equal to 90 degrees plus the said angle a.

Ball Joints.—It may be said with a full degree of assurance that the steering is such an important function of an automobile that in its failure, the most serious danger lies. The possibility of a ball-socket joint becoming detached should be provided against in a mechanical and absolutely dependable way.

Valveless Motor Research

Conservative Makers on Lookout for Novelties



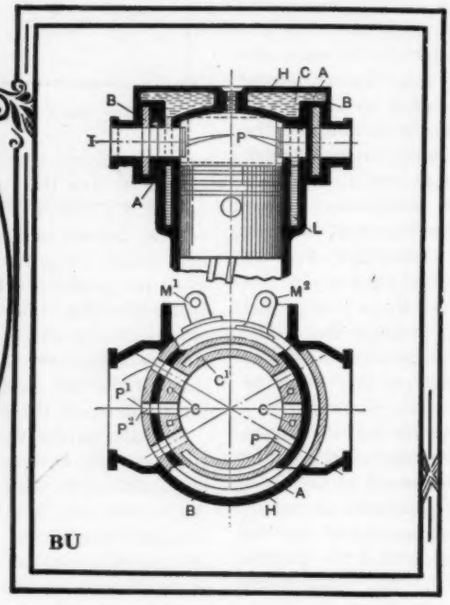


Fig. BT—Showing two sectional views of the Clifton motor together with the rotary valve

Fig. BU—Plan and transverse sections of the Hay rotary sleeve valve motor

Fig. BV—Method adopted by Samain in operating the double sleeves for controlling the gases

Fig. BW—Section through the Minerva-Knight motor showing the shape of the ports

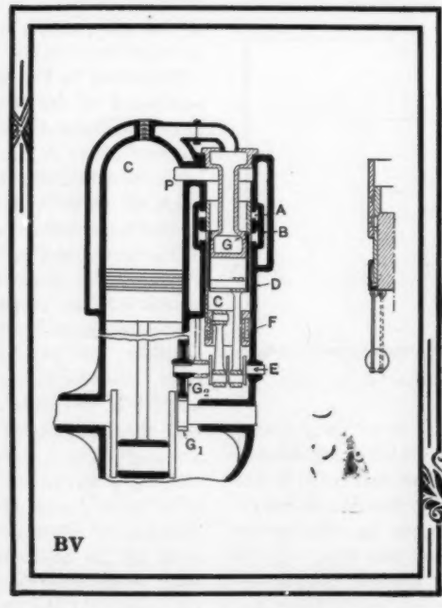
Among the motors here shown is a description of one patented by the Renault Company in France, which, up to the present, has not been incorporated in any of the firm's standard models. Such being the case it must be a warning to inventors that they must not expect that all they have to do is to invent a motor and then cash in.

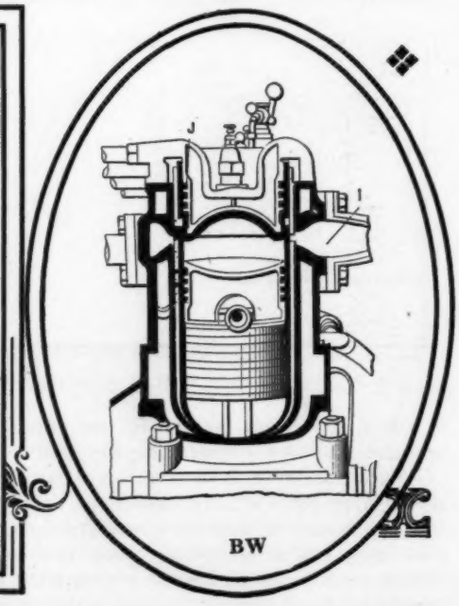
THERE are certain problems involved in the valveless motor that need more than a dash of the pen to explain or criticise. Familiarity with the practice in vogue in the conventional poppet valve motor will require supplementing in order that the engineer shall be in a position to take the new situation in hand seriously. What was good in the above-mentioned types may prove an utter failure in a valveless motor. There seems to be an idea in some people's minds that the sleeves of some of the commercialized propositions will wear unduly and thus allow the compression to leak.

As far as experience goes this has not been the case and instead of deteriorating motors have shown a tendency to improve. When the length of the sleeves and the large film of oil that surrounds them are considered it must be clear to most people that the gases will follow the line of least resistance, which is out of the ports provided, rather than endeavor to pass between the sleeves. Another point to be remembered is that the carbon generated in the motor acts as a lubricant and fills up the interstices of the metal, thereby eliminating wear. One has only to look at one of these motors after it has been taken down, to be convinced of this fact.

Clifton Motor Utilizes Rotary Valve in Shape of Cam

The mechanism of the rotary valve of a Clifton motor consists of a combination of a cylindrical valve casing B in the cylinder head and an induction passage D leading into the base of the casing, one or more ports B1 in its cylindrical wall connecting to the cylinder A. The rotary valve C fits into the casing B, the valve being opened at the bottom so that its interior is in communication with the induction passage D having one or more inlet ports C2. One or more ports B1 are provided in the wall of the casing B and the passages B2 connect the ports to the cylinder A. The rotary valve has inlet ports C2 leading from its interior which is in communication with the induction passage D, and exhaust port C3 is connected to an outlet in the top of the valve by the passage C4. The ports B1 in the casing B are controlled by an auxiliary lift valve F situated in the passageway B2, in addition to the rotary valve C. An auxiliary valve F is also provided, directly actuated by a cam on and controlling the same port as the rotary valve C. The method of operating this type of valve is shown in Fig. BT.





Hay Motor Employs Two Concentric Rotary Sleeve Valves

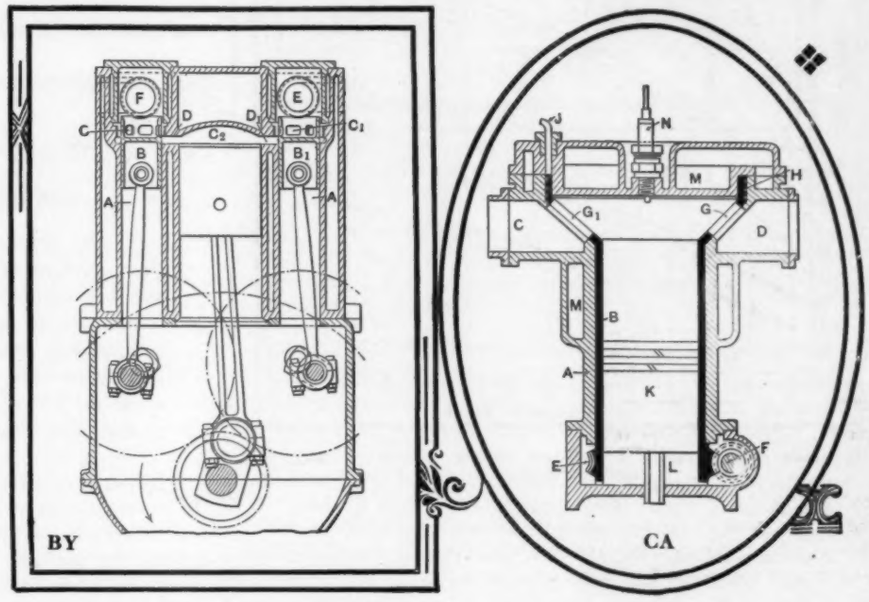
In Fig. BU can be seen the method employed by J. Hay of controlling the ports of a four-cycle motor by means of two sleeves. The cover H which encloses the valves is provided with water cooling in the manner shown and the water space in the head is connected to L by means of a channel. Both sides of the valves A and B have cut in them ports P1 and P2 on the inlet side I. Where the ports are in multiple the port sleeves have passages in them at C, which are necessarily smaller but serve to maintain the valves and other parts at an even temperature. The valves are operated from the crankshaft through suitable gearing through the medium of the half-speed shaft. The arms M1 and M2 are attached to the sleeves B and A respectively.

Principles Governing the Gaubert Sleeve Motor

The section of the motor in Fig. CB, the patent for which has been registered by Marcel Jules Marius Gaubert, shows the manner in which a single sleeve operates the ports on a motor of the four-cycle type. Attached to the crankshaft are cylindrical members C with helicoidal grooves cut therein in which pins attached to the ends of the lever H are fitted. The rotation of the cylinder C causes the lever to be displaced laterally, which action causes the sleeves to be drawn down or pushed up as shown on the right-hand side of the section CB.

Minerva Motor Built Under Knight License

The Minerva motor, a section of which is shown in Fig. BW, is built under the Knight patents and has, as can be seen from the illustration, two concentric sleeves interposed between the piston and the cylinder wall. The illustration affords an idea of the method employed by this firm of carrying out such features as motor cooling, the position of spark plugs and in particular the throats of the passageways for the exhaust and intake gases. The inlet passageway I is enlarged at the point where the manifold is attached to the cylinders and narrows down in order to conform approximately to the size of the slot in the sleeve. The junk ring J has four rings and the piston has a like number. The cylinder head together with the piston is so formed that the compression chamber is rendered almost spherical. The position of the spark plug immediately at the top of the sphere relieves the motor of any gas pocketing. The accompanying diagram shows the horsepower curves of various types of Minerva motors, both with the conventional type of valve as compared with valveless motors of the Knight type. The appreciable gain in power in the valveless motor over the other type is more noticeable as the speed increases, which may be due to the fact that motors of this type have very little compression at low speeds, which, however, materially increases with the corresponding increase of the motor speed. In the 16-horsepower type shown at B in the diagram it will be noticed that the size of the motor is 3 millimeters less in bore than the motor, the curve of which is shown at A.



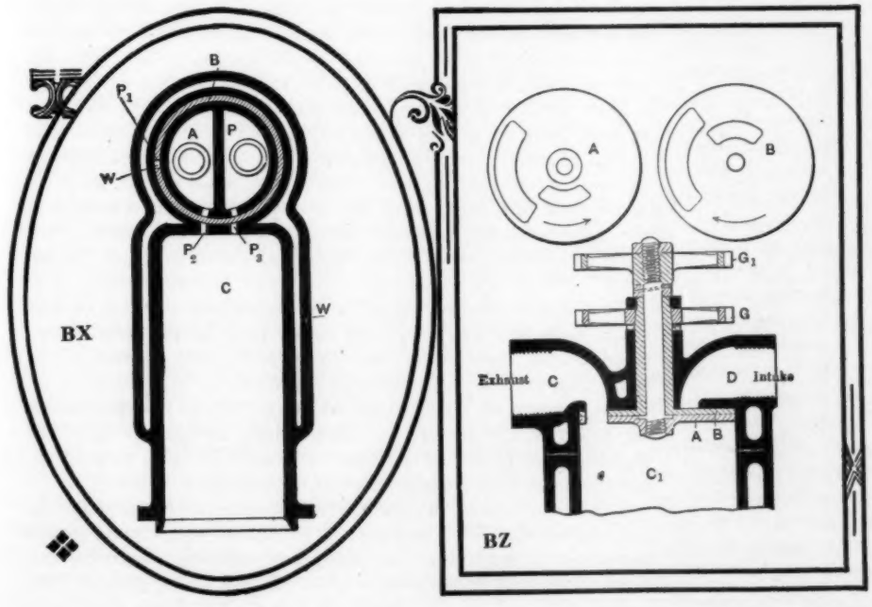


Fig. BX—Section through the Harper motor, in which two sleeves are employed

Fig. BY—The Albion motor, in which piston valves replace the conventional poppet valves

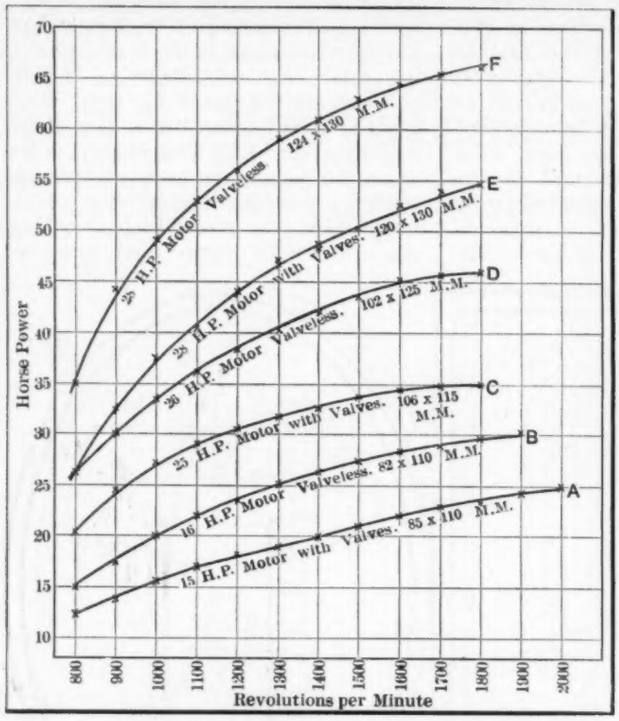
Fig. BZ—Method of operating the disc valves in the Rowell and showing the port openings

Fig. CA—Section through a cylinder of the Renault rotary sleeve valve motor

Again looking at the curve E at 1,500 revolutions there is a difference of 13 horsepower at this point, whereas at the 800 revolutions per minute of the engine point of intersection there is only a difference of 9 horsepower.

Harper Motor Employs Stationary and Rotary Sleeves

It is possible from the sectional view of the motor shown in BX to see the method by which the regulation of the gases is effected. The cylinder C is water-jacketed at W and W1, the upper portion W1 being in direct communication with W. Two concentric sleeves are situated in the cylinder head and extend the whole length of the cylinders which are necessarily cast en bloc. The inner sleeve A is divided along its entire length by the partition P which makes it possible to utilize it both for the intake and exhaust gases. This sleeve A is stationary, while the sleeve B through suitable mechanism is caused to rotate and



Horsepower chart showing the variations between the Minerva poppet and sleeve-valve engines

allow the port P1 to command the passage of the gases either in or out of the cylinder through the slots P2 and P3. This motor was registered by Harper and Lane.

Piston and Sleeve Valve Used in the Samain Motor

The cylinder is cast with a cylindrical chamber at the side, connected by a port P at the top of the combustion chamber C and provided with passageways A and B, the former being the inlet and the latter the exhaust. Laying between the wall of this cylindrical cylinder and the central water-cooled column is a ported sleeve C and within this is another sleeve D which are actuated by separate cranks upon the eccentric shaft E which runs at half speed. The cranks are set at an angle of 20 to 30 degrees apart. The sleeve C is actuated as regards its downward movement through the medium of a spring F and the top of the sleeve D seats against the shoulder formed at G on the interior of the outer sleeve C. The two sleeves rise together when opposite the intake port A and the relative position of their cranks cause them to separate and put the inlet passage into communication with the chamber and engine cylinder.

During the compression and firing strokes the two valves are moved downward, the port in the outer sleeve being closed as is shown in the illustration. In registering with the exhaust port the sleeve is moved in an opposite direction, opening up the exhaust. The compression space in this motor seems to be considerable. The eccentric shaft E is driven by means of the gear G1 which is attached to the crankshaft and to the half-time gear G2. A section of the motor is shown at BV.

Albion Motor is Fitted with Two Piston Valves

The Albion motor shown in section in Fig. BY needs but little explanation. Piston valves operated by connecting rods attached at their lower end to small crankshafts cause the valves to reciprocate in the auxiliary cylinders A. The manifold ports C and C1 are placed in communication with the working cylinder C2 and permit the gases to be taken in or expelled from the cylinder through the passageways D and D1. The gas enters the inlet chamber by the passage E and passes out of the exhaust manifold to the outlet F. The pistons B and B1 are fitted with expanding rings to insure gas tightness.

Two Rotary Disc Valves Used in Rowell Motor

The rotary disc valves employed in the Rowell motor, as shown in the section of a cylinder head in Fig. BZ, have all the valve faces together with the inside face of the combustion chamber first turned flat and afterward ground. The ports C and D are for the exhaust and intake respectively. The valves A and B are caused to rotate inside the cylinder C1 by means of gears G and G1 in opposite directions, thus increasing the opening and closing speed. The inlet port opens and closes on dead centers,

New Models and New Methods of Painting

In the present article by M. C. Hillick attention is called to the fact that the choice of colors for body painting should have some definite relation to the appearance of the body. Paint is intended to bring out the lines of the body and emphasize the builders' art. It is little use to treat all body surfaces alike, for each requires special handling.

THE changing times imply changing methods, and the variations, however small, in style, design and model, which find expression in the 1912 car, invite—in fact, compel—some distinct, yet, perhaps, apparently minor, change in the practice of painting formerly in favor.

Painters in common with automobile owners and users are alive to the fact that the style and design—or the model, if you please—of the car body must govern to no small extent the choice of colors to be applied. In the future, at any rate, this principle will find recognition to an extent hitherto unknown.

First a study of the model, its needs—everything, in fact, that it must have to give it a compelling power of attraction—and then a scheme of color adornment in the highest degree effective to develop all the fine and shapely attributes of the car. To accomplish this result both the painter and the car owner, or the painter acting upon the authority of the car owner, must have color sense, or as it is commonly understood, "an eye for color."

This end is not gained by a lavish employment of various colors upon any single car, but rather by a simple color design in which the form of the car is not blotted out or overcast by some meaningless combination of pigments.

The mission of color is not to detract from, nor to conceal, the grace of the fashion of the builder's design. It is in the dignity of the car, and to whatever extent it fails, to that extent, we must understand, it fails in its appointed office.

The pressed steel, or, perhaps we should say more explicitly, the pressed steel sheet automobile body, will to a certain extent necessitate a method of surfacing and painting somewhat different from that which obtains under the use of the present body material.

Pressed steel surfaces, unless they come to the painter with a coat of enamel baked on, over which the paint and color structure and the varnish are forced to find a foothold, require a special treatment of which the best is a thorough sandblasting. This treatment eliminates all rust and scale formation, and insures for the subsequent coatings a foundation as honest as the heroes of ancient days.

Over this sandblasted surface a coat of metal primer—a material that dries hard and firm, yet sufficiently elastic to enable the paint fabric to respond to all the laws of contraction and

having a radial opening of 90 degrees × the width of the port, which can be seen in the illustration. During the compression and firing strokes the ports on opposite sides of the combustion chamber are closed by the solid parts of the valves. The exhaust port is given a lead of 10 degrees for each valve, thereby obtaining an opening of 20 degrees × the width of the port, which will give an opening with the lead of 20 degrees to the crankshaft, which, however, can be altered. By the time the piston has traveled half way up the cylinder on the exhaust stroke there is a radial opening of 100 degrees × the width of the port. The valves are drawn up to each other by means of spring washers which will give in case of expansion. The design of this motor relies upon a film of burned oil and carbon between the valves as

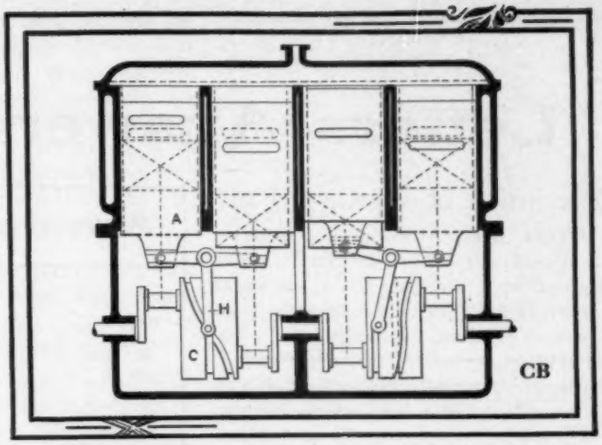


Fig. CB—Transverse section of the gaubert motor showing the method of reciprocating the sleeves

expansion—should be applied. Not only contraction and expansion of the steel sheets, but their action under the strain of service vibration and roadway oscillation must, so far as possible, be overcome through the resilient nature of the priming and primary surfacing mediums.

To what extent the steel sheet automobile body will be used is hardly within the bounds of conjecture, but it is an issue which the painter will be forced to meet and plan to surmount. It is an issue, moreover, that the car owner will be vitally interested in, since appearance, and the cost of maintaining the appearance of the car depends in the last analysis upon whatever degree of durability the painter is able to establish.

Upon the primer here referred to should be applied, in due time, a surfacing coat of body and substance, touched off with enough raw linseed oil to yield a good and elastic foundation upon which, after two or three days' drying out, the necessary puttying may be done. The main thing which the painter needs to attend to at this stage of the work, and which the car owner and the party selling the car expect him to attend to, is to stop up the surface with a resolute body of pigment, supplementing this by puttying, and putty glazing any and all existing surface defects—developing, in a word, a flawless and an exceedingly strong foundation.

In all steel surfaces over which a fine, mirror-like finish is desired the first principle involved is to secure a depth and power of pigment that may be rubbed down with artificial pumice stone to a perfectly level and smooth surface without at any point laying bare the metal beneath.

As a means of avoiding this condition of things many of the best craftsmen have adopted the practice of using the rubbing stone dipped in benzine instead of water. This insures the surface from dampness, in case of getting through to the raw metal and from all the trouble following in the make of moisture.

For a high-class finish one coat of primer, one coat of filler, and four straight coats of roughstuff are needed.

All these materials may be bought, and economically bought, we believe, ready mixed and fit for the brush.

Their application deserves to be on a plane with the quality of the goods, and the painter owes it to himself, and to the present owner or prospective buyer of the car, to see that such is the case. Workmanship and quality of materials employed should precisely match if out of the combination we are to have the issues of life and length of day for the car surface.

Over the foundation above referred to belong two coats of the selected body color, with a coat of varnish—color or glaze coat to be flowed over these. Then in some cases, depending, of course, on the color selected, an additional coat of glaze or varnish color will be required. Usually this last varnish-color or glaze coat carries less pigment and more varnish.

After this coat is rubbed lightly with water and pumice stone flour the striping and ornamentation is applied over which is next flowed a coat of clear rubbing varnish. In due season this coat is rubbed thoroughly and uniformly with water and pumice stone flour, washed and cleaned, and finished with a varnish of the best body and brilliancy.

a lubricant. Apart from the shape of the ports there is nothing novel in this motor and if the question of priority should ever come up for decision this type of motor will undoubtedly furnish several claimants.

Renault Rotary Sleeve Valves Show Originality

As has previously been stated in the columns of THE AUTOMOBILE, conservative and old makers of cars are not letting the grass grow under their feet in the matter of new types of motors. The section of the motor shown in Fig. CA is of the design patented by Louis Renault. It will be seen that there is a cone-headed sleeve B placed concentrically within the cylinder A. The sleeve is provided with four ports formed in the cone section at G and G1. The sleeve is caused to rotate through the action of the screw wheel F which engages with the helicoidal rack E. By these means the cone-headed sleeve is rotated at a speed required to close the ports to coincide with the two openings C and D as required for induction and exhaust. The speed of the sleeve is one-eighth engine speed. The outer flange portion of the sleeve above the cone is made with three grooves as shown at H for the accommodation of three compression rings which assist in forming a gas-tight joint.

In order to allow for the necessary additional period of exhaust opening as compared with inlet opening the ports in the cylinder heads are not set diametrically opposite to one another as in conventional practice. It is intended that the inlet ports shall open 10 degrees after the upper and close 25 degrees after the lower dead center. The exhaust will open 40 degrees before the lower, and close 5 degrees after the upper dead center. This gives an induction opening of 195 degrees and an exhaust opening of 225 degrees, the travel with all ports closed during the compression and explosion moments of the piston being 295 degrees and between the closing of the exhaust and the opening of the induction port 5 degrees with ports closed. An oil lead at J is provided for the lubrication of the upper extremities of the sleeve, suitable grooves being provided to conduct the oil to the sleeve proper. The shape of the combustion chamber formed by the cone head does not follow the practice set by other designers of valveless motors.

WATER IN CYLINDERS MAKES FOR TROUBLE—Frequently it is found that water passes into cylinders through defects in castings in which slag is enmeshed or due to misplaced cores. A large number of cylinders are so designed that the plug in the cylinder heads fail to satisfy the requirements and water finds its way into the cylinders as a result. The defective plug is inadequate, and a plug (bronze) may be screwed in, forming the connecting link between the inner and the jacket doors. In service due to differences in heat the thread on the plug is liable to strip at the inner dome and water will readily pass into the cylinders.

Letters Answered and Discussed

Description of Flywheel Fan

EDITOR THE AUTOMOBILE: [2,790]—Would you publish in your columns a description of the type of fan known as the flywheel fan? Is the fan separate from the motor or does it perform the office of a flywheel as well as that of a fan? I would appreciate any information that you may be able to give me on the subject.

C. R. STURGESS.

Penmar, Pa.

The flywheel fan is in common use. It is an integral part of the flywheel, the fan blades being the spokes of the wheel. The accompanying illustration (Fig. 1) shows the method of casting the fan. It is of use in exhausting the heated air from the motor and must be installed beneath a closed hood.

Duryea Has Last Word

Editor THE AUTOMOBILE:

[2,791]—I grant the willingness to stick to the original question, also that an unbroken film is desirable. But you have not said what that film shall consist of. Water is a good lubricant for certain bearings. Soap-suds produces the finest films in the world and is often used for lubrication. Many oils contain soap; rosin is often present; paraffin wax is very common; kerosene is frequently found, and even gasoline in small quantities is not appreciably harmful. So your belief that a film of lubricant cannot be reasonably well secured unless the oil is free from adulteration is certainly far from having fact as its foundation. There is very little pure oil used. Most of it contains some adulterant or other, and many oil dealers will tell you the adulterant adds body and permits the "film" to do its duty. Your argument that only 1 per cent. of the users use the mixture system and therefore it stands condemned, is sheer foolishness. You can easily remember the time when no one drove an automobile, for there were none. The great majority of road users to-day still drive horses. It surprises me that you do not follow their lead and get onto a horse paper.

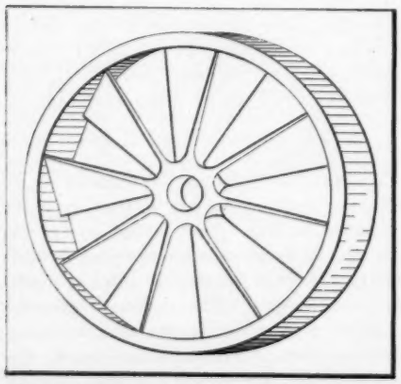


Fig. 1—Common form of flywheel fan in which the vanes of the fan are formed by the spokes of the wheel

You are utterly wrong in this matter. The Holsman engine as now made offers no difficulty at all to avoid carrying the mixture into the case, but on the other hand the designer goes out of his way to do this thing. He carries the mixture in and then out again just as any engine-maker can do, and quite evidently does it to get the perfect lubrication feed.

The real question is, Will a mixture method of feeding oil serve as well or better than a complicated mechanical feed? The answer as proven by many users and years of time is that it is better. No prejudice or argument can change this fact. It is a fact and will remain so no matter whether the public or the press believe it or not. My point is that you damage the public by misstating or hiding the real facts. I have no patent on the method, nor did I even originate it. I have used it exclusively on my limited product for some years. I know it is best. You will not need to live long to see several other tenths of 1 per cent. using it.

CHAS. E. DURYEA.

Announcement

MY 1912 AUTOMOBILE

So much interest is being taken in the coming 1912 models that already criticisms are being heard to the effect that the 1912 automobile is not meeting the expectations of many readers of THE AUTOMOBILE. *In order to discover exactly what are the conceptions of the many readers on the 1912 machines* THE AUTOMOBILE *starts this week a discussion on the 1912 models and hereby invites every reader to mail in what are his or her conceptions of next year's car. The information given should include such points as:*

Horsepower	*Tire sizes*
Bore	*Rear axle*
Stroke	*Front axle*
Ignition	*Control parts*
Lubrication	*Body features*
Carburetion	*Equipment*
Clutch	*Cylinder type*
Gearset	*No. of cylinders*
Drive	*Cylinders, how cast*
Springs	*Price*
Wheelbase	

In addition to giving these details the reasons for your points of selection should be stated concisely and clearly.

As a benefit in the matter of comparison some details of the average cars for 1911 are given herewith, these details being for cars selling at $1,000 or thereabouts; $1,500 or thereabouts; $2,500 or therabouts, and $4,000, thereabouts and up.

Each communication must be legibly written on one side of the paper only; it must be properly signed with the writer's full name and address, and if the writer does not wish his own name to appear in print he may request the use of any nom de plume.

Any reader desiring to make line drawings, showing details of his ideas of his car or some of its parts, is requested to do so.

Editor THE AUTOMOBILE.

A New Starting Handle

Editor THE AUTOMOBILE:

[2,792]—I was very much interested in a story which recently appeared in your paper regarding the way the average starting handle is put in place without any apparent regard for the comfort of the man who is to crank the car. My interest was to a great degree accentuated by the fact that my hands have undergone the same tearing process as was illustrated in that story. My object in writing you this communication is not, however, to wail over the evils that be, so much as to find a remedy therefor. In other words could you suggest a form of starting handle which will do away with the bad features you have named?

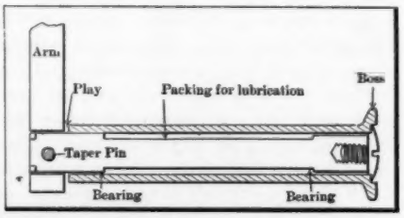


Fig. 2—A suggested form of starting crank in which the play is slightly exaggerated for the purposes of illustration

CALLOUS.

Reading, Pa.

A form of starting handle we might suggest is shown in Fig. 2, which explains itself. The play is exaggerated slightly to show better where it should be. The materials may be of anything suitable, such as a bronze core with a wood handle, or a brass handle, as preferred. The packing, if two metals were employed, may be a composition of white lead and tallow.

Geometric Information Required

Editor THE AUTOMOBILE:

[2,793]—Could you kindly inform me through your columns the names of the two geometric curves used in laying out gear teeth and how they are generated?

Worcester, Mass. STUDENT.

The two curves you refer to are probably the epicycloid and the hypocycloid. The epicycloid is the curve generated by the circle rolling on the outside of the pitch circle and the hypocycloid that generated on the inside. Cycloids are the resulting curves when the pitch circle has an infinite radius, or in other words, is a straight line.

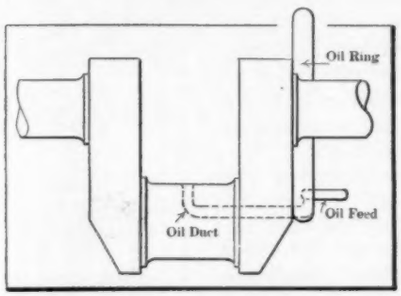


Fig. 3—Method of fitting centrifugal oil ring to crank throw. The oil duct is shown

In Need of a Glasscutter

Editor THE AUTOMOBILE:

[2,794]—I would like to have sight holes cut in the glass of my wind shield. The size of the holes required is from 6 to 8 inches in diameter. I notice some of these sight holes are equipped with glass coverings. Would you kindly let me know who does such work. C. P. FIELD.

Peekskill, N. Y.

Any good glass cutter or wind shield maker will do the work you mention.

Does Not Get Enough Oil

Editor THE AUTOMOBILE:

[2,795]—My motor is lubricated by the splash system and so far as the cylinder lubrication is concerned there is no cause for complaint. The main bearings are also lubricated by the same method and are supplied with enough oil to amply lubricate them. In fact, the oil is led into the central main bearing before flowing into the splash troughs. The connecting rod bearings at the crank end, however, are not sufficiently supplied and I would appreciate it greatly if you would tell me of some means whereby I could increase the supply of oil to these bearings.

EKTON PIERCE.

Coytesville, N. J.

One of the most satisfactory methods of lubricating the crank pin is by means of a centrifugal oil ring. This ring or disc is fitted against the crank cheek and is bent or stamped so as to have a hollow rim which collects the oil naturally sent to it by centrifugal force. A duct or lead as shown in Fig. 3 is fitted within this rim and a hole is drilled, as shown, into the crank pin in case the same is not hollow. If it is hollow, the drilling is of course unnecessary, except the lateral drilling from the surface of the pin. If for some reason it is impossible to fit the oil ring, and the construction of the connecting rod cap permits, a hollow scoop spoon may be fitted which will lead the oil directly into the bearing. If information is desired on the method of attachment we will gladly supply it through these columns.

Repaired Float as Directed

Editor THE AUTOMOBILE:

[2,797]—I repaired the leaky carbureter float as directed in your columns and found that I could get the old gasoline out better by boiling than by blowing it out. I hope this "tip" may be of use to some reader.

Kingston, N. Y. R. T. CORRY.

Wants Information on Keys

Editor THE AUTOMOBILE:

[2,796]—I was very much interested in your reply to query 2,773 regarding the size key to use for a given shaft, and whether one key was as strong as two. In thinking over the subject it has occurred to me that the matter of the length of the key would enter into the discussion as well as the other dimensions given in your columns in reply to the above query. I would greatly appreciate your views on this subject, as well as an analysis of the failure of the key; that is, if it fails by shearing or by some other method of fracture.

J. SCRIVENER.

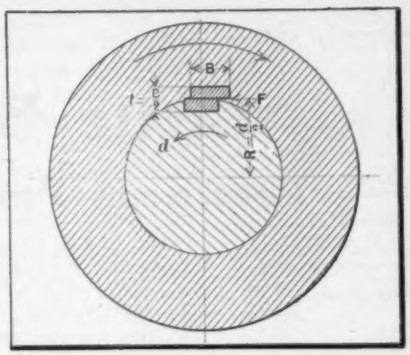


Fig. 4—Illustrating the method of failure by shear of a key and the relative dimensions used in common practice

Newport News, Va.

In the design of a key the ideal condition is obtained when the ultimate shearing stress of the key is equal to the total resistance against crushing. There are other considerations entering into the problem which cannot be overlooked, among these being the wedge effect when the key is a tight fit which overcomes the crushing strain to a considerable extent. Working out an expression for length by Spooner's method:

$$\frac{d^3 \pi f_s}{16} = \frac{F d}{2} = L B f'_s \frac{d}{2}$$

and therefore $L = \dfrac{d^2 \pi f_s}{8 B f'_s}$

assuming that we wish to determine the length of the key in terms of the other quantities, and the strengths of shaft and key are equal. Referring to Fig. 4, L equals the length of the key; B, the breadth; t, mean thickness or B|2; f_s, safe shear stress of shaft per square inch; f'_s, safe shear stress of key per square inch; F is safe shear force on key, equal to LBf's, and T is the moment of resistance to twisting of shaft equal to $\dfrac{d^3 \pi f_s}{16} = \dfrac{F d}{2}$.

DETAILS OF AVERAGE 1911 CARS WHICH WILL ENABLE READERS TO MAKE COMPARISONS IN DISCUSSING 1912 MODELS

	$1,000 and thereabouts	$1,500 and thereabouts	$2,500 and thereabouts	$4,000 and thereabouts
Horsepower	20.5	29.525	35	43.66
Bore	3.98 *inches*	4.19 *inches*	4.40 *inches*	4.875 *inches*
Stroke	4.12 *inches*	4.64 *inches*	4.98 *inches*	5.39 *inches*
Wheelbase	100 *inches*	114 *inches*	119 *inches*	124 *inches*
Front tires	31.4 × 3.3	33.1 × 3.8	35 × 4	35.7 × 4.27
Rear tires	31.4 × 3.3	33.1 × 3.8	35 × 4.1	36.7 × 4.55
Number of cylinders	*Four*	*Four*	*Four*	*Four*
Cylinder type	*L-Head*	*L-Head*	*L-Head*	*T-Head*
Cylinders cast	*Pairs*	*Pairs*	*Pairs*	*Pairs*
Ignition	*Dual*	*Dual*	*Dual*	*Dual*
Clutch	*Disc*	*Multiple disc*	*Cone*	*Multiple disc*

Little Bits of Motor Wisdom

Pertinent Pointers for Repairman and Driver

A series of short stories that will tend to keep the automobilist in touch with matters mechanical and otherwise, covering a field of information that although usually well tilled, needs frequent and careful cultivation to produce the greatest results.

CARBURETERS BLAMED WITHOUT CAUSE—Whenever the engine has been misbehaving for a length of time and the owner of the car has reached the conclusion that it behooves him to do a little tinkering and thus cut down the repair bills, he will almost invariably start to work on the carbureter, no matter what the previous symptoms may have been. In doing this he not only exercises a commendable spirit of economy but a very unenviable lack of foresight. Any carbureter will balk if it is clogged with foreign matter or if it is not regulated so that the best carburetion may be had at the greatest range of speeds; but when an inexperienced motorist—or perhaps an experienced motorist and an inexperienced repairman—starts to work with a hammer and screw driver the result is very sure to be not only a balk but a permanent disinclination on the part of the carbureter to work at all.

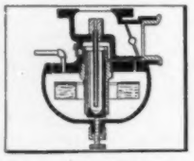


Fig. 1—Type of carbureter known as float feed, in which the supply of gasoline is governed by a cork or hollow copper float, either type being common

The symptoms of carbureter trouble are sometimes rather elusive, it is true, but they may be located by a careful process of elimination which will after a while bring the searcher down to the heart of the matter. If the trouble is finally located in the carbureter and the matter is a lack of suitable adjustment and not a piece of cotton waste in the needle valve or other foreign matter the adjustment will have to be systematically taken up and not done in an erratic fashion, as this will only lead to greater trouble and dismay on the part of the operator. Almost any carbureter on the market will give very satisfactory service for a limited range of action, but this range is often found to be too small, and it is then that the carbureter needs adjustment. The action of the instrument may be all right at low speeds and all wrong at high, or the opposite may be the case, according to the original factory adjustment.

In the case of a float feed carbureter, such as shown in Fig. 1, the gasoline level rises in the float chamber gradually, lifting the buoyant float until the proper level is reached so that the surface of the gasoline is about 1/32 of an inch below the nozzle of the jet and the current of air in passing by the jet will suck the gasoline through the orifice in the form of a spray. After having approximately regulated the gasoline level so that the float will close the needle valve at the proper time the next regulation will be in the way of a proper adjustment for the amount of air permitted to be drawn through the carbureter at medium speeds. After having the carbureter regulated so that it will work satisfactorily at medium speeds with the correct spark advance, throttle the engine and retard the spark; if heating results, close the needle valve opening slightly and observe the action. The needle valve should be closed until the motor does not smoke and runs satisfactorily, then run the engine on medium speed again and make any slight adjustment necessary. The same process should be gone through repeatedly until the motor will run well on both medium and low speeds. The adjustment is then made for high speeds in the same manner with due regard for the auxiliary air regulation if there is any. The difficulties of satisfactory carburetion are, of course, much greater at low speeds than at high speeds and there is a great tendency to draw the liquid gasoline through the manifolds in solid globules instead of the fine spray which is the ideal state in which to attain perfect vaporization the gasoline if drawn through the inlet valve in the form of a liquid will tend to form carbon deposit in the cylinder.

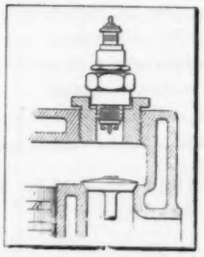


Fig. 2—Illustrating a spark plug which is too short to reach into the combustion space

---

SPARK PLUGS MUST BE OF CORRECT LENGTH—In fitting spark plugs to the cylinders care must be exercised that they are the correct length so that not only the maximum efficiency is obtained from them but that they are preserved from rapid wear and deterioration. The accompanying cuts, Figs. 2, 3 and 4 show the three conditions. The first shows a spark plug which is too short, the plug being in a recess in which carbon would collect and fill the gaps. The screw threads in this recess also aid in the work of holding the foreign matter in a place where it would soon foul the spark plug. The second plug is much too long, projecting far into the cylinder and subjecting itself to the hottest gases, which will soon cause the end of the plug to glow and thereby cause pre-ignition and after a time fuse the points of the plug together. The last sketch of the three illustrates a spark plug which is of the correct length. The points of the spark gap project far enough into the cylinder to effect the greatest firing efficiency possible, and the plug itself is kept cool by the surrounding walls without having any recess in which the carbon may be caught and held. Before buying the plugs this required length should be determined, as after they are purchased it is a rather difficult matter to make any correction and in most types of plug it is an impossibility. The gap should be inspected before placing the plug into the cylinder, as it is almost impossible to estimate the great losses in power and efficiency which can be traced to a weak or insufficient spark.

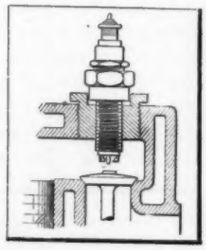


Fig. 3—Method of inviting pre-ignition. The spark plug shown is too long and will soon glow and fuse the points

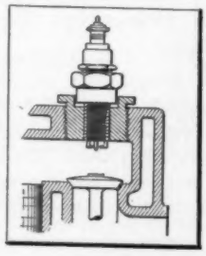


Fig. 4—Showing the proper length of the spark plug, the only part projecting into the combustion space being the sparking points

BE PREPARED WHEN TOURING—A touring party is, to a great degree, in the same position as an army in that it has to gather its supplies from the country through which it is traveling; hence it is very often possible that many little devices which have been the fruit of experience in the army line may be made excellent use or by the motorist. Such a device is the portable filter illustrated in Fig. 5. Suppose that the supply of water should give out far from any village or else fall so low that there is a great necessity of replacing it. To dip water from the average pool is not an advisable procedure on account of the foreign matter generally contained in such water. The portable filter is designed for just such a purpose, as it may be used for drinking water; indeed, its original purpose is just that.

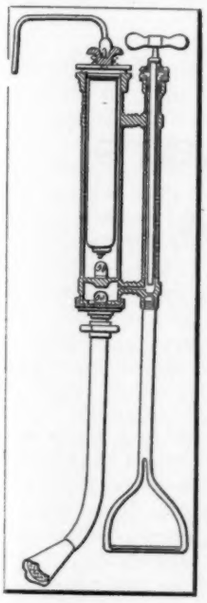


Fig. 5—Type of portable filter in use by the army. It is comparatively light, compact and easily carried

The tube, which has a strainer on the end, is placed in the pool or stream and the handle on the plunger is pulled up. This action will fill the chamber with water, while the down stroke will send it up through the filtering chamber and out of the tube at the top. Besides being of use for radiator water the device can of course be used for drinking purposes and might in this manner prove itself as valuable as when used in the former emergency.

Another great advantage of an instrument of this type is the fact that the capacity is unlimited, while the vacuum bottles which are sold to tourists under various trade names have a very small capacity and hence an entirely limited sphere of usefulness. The vacuum bottle is designed not as a source of permanent supply but to furnish the owner the luxury of a hot or cold drink when such are not readily obtainable. It is by no means safe to drink from a stream of unknown source, no matter how clear and limpid its waters may seem as there are many disease germs which are carried an incredible distance by means of a stream, and although the apparently uninhabited state of the country may indicate that it is safe to risk the few longed-for swallows it is much better and safer to have filtered water when possible. Well water itself is often poisoned, especially if the well is comparatively shallow, by its nearness to foul cisterns or garbage dumps in country houses.

Solid matter within the radiator will eventually be deposited on the radiating walls and greatly impair its utility, and indeed after a time cut down the power of the engine by not adequately cooling parts which cannot stand a higher temperature than that for which they are designed. If the circulation is clogged up the water will also tend to boil and hence form steam which will leak past the joints and by its much greater temperature than the water from which it was formed, greatly augment the deposit of scale on the cellular surfaces.

ONE KEYWAY SUFFICIENT TO HOLD A SHAFT—It is not necessary to cut away unnecessary material by making two or more keyways when it is a fact that one key will hold as well if not better than any number if it is properly designed and if the key is of proper material. In the accompanying cut, Fig. 6, D is the diameter of the shaft, W the width of the key, A the depth of the keyway and R the radius of curvature of the edges of the keyway. The key is of the correct size when it is of equal strength in all ways, that is, when the resistance to sheer is the same as the resistance to torsional strains. The ideal condition and the one which is made the aim in all the dimensions given by the standard manufacturers, is that in which the moment of inertia of the key about the diameter of the shaft is the same as that of the shaft about the same diameter. To illustrate the size key required for a shaft of common size it may be well to consider a particular case. Take D equal to 1 1-4 inches; W will equal 3-16 inch. A 3-32 inch and R .04 inch. If it were figured out mathematically it would be found that the moment of inertia of the circle less that which was taken away to make room for the key would be equal to the moment of inertia of the key.

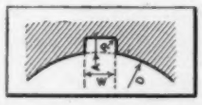


Fig. 6 — Illustrating form of a standard keyway. A, depth of key; D, diameter of shaft; W, width of key; R, radius of curvature of key

---

DIRECTION OF MAGNETO CURRENT ALTERNATES—As the armature rotates between the two pole pieces in the ordinary magneto the current is generated by the cutting of the magnetic lines of force between the north and south poles of the magnet. Fig. 7 illustrates the armature in diagrammatic form as being in one of the positions taken up during a complete revolution. It is evident that as the armature continues to rotate the part which is nearest the north pole will be nearest the south pole, and the current instead of running from a to b will take an opposite direction. It is thus evident that there is a reversal in direction of the current at every 180 degrees through which the armature passes. Since the current passes through this reversal in direction it is very evident that there is a point where there is no current at all since it would be impossible to change from one direction to the other at the same instant. An examination of the cycle of events also shows that the current becomes less as it approaches this point until it reaches zero, it then increases until it is a maximum after the armature has revolved through 90 degrees from the point of zero current. In magneto timing a point is made therefore, of arranging the gears so that the spark is given at the point of as near maximum current as possible under the greatest number of conditions.

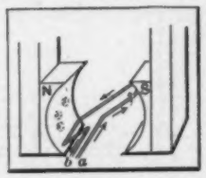


Fig. 7 — Illustrating the direction of the current when the armature takes up the illustrated position. Current flowing from a to b.

BALL CHECK VALVES MUCH USED—The ball check valve is one of the smallest and most compact forms of satisfactory non-return valve. It is true that this type of valve is occasionally charged with having a great penchant for sticking if great precaution is not used in keeping it clean. The uses for the ball check, however, are so great that in some cases where there are no chances of its fouling, it is practically infallible, as for plunger oil pumps, etc.

In the illustration Fig. 8, a ball check is shown. The liquid is free to flow through the pipe in one direction without any interference on the part of the ball check, but when there is a tendency to flow back the pressure forces the ball into its seating and very effectually checks the flow. It is in the case of the ball being thrown violently into its seating that the sticking tendency makes itself felt to the greatest degree. This is especially so if there is any oil deposit on the seat or if foreign matter has collected there to any extent. In some forms of oil pumps the ball check valves are to a great extent self-cleaning since they are arranged in such a way that the flow of oil takes away any deposit which may have accumulated.

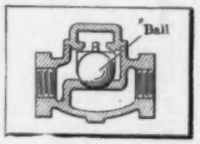


Fig. 8—Form of non-return value known as the ball check, often accused of having a great penchant for sticking

Another cause of sticking in this type of valve is that the balls are often too small and sink into the aperture much further than intended. It does not take much of an indentation to hold the ball firmly in place, while if too large it is apparent that they are apt to become stuck.

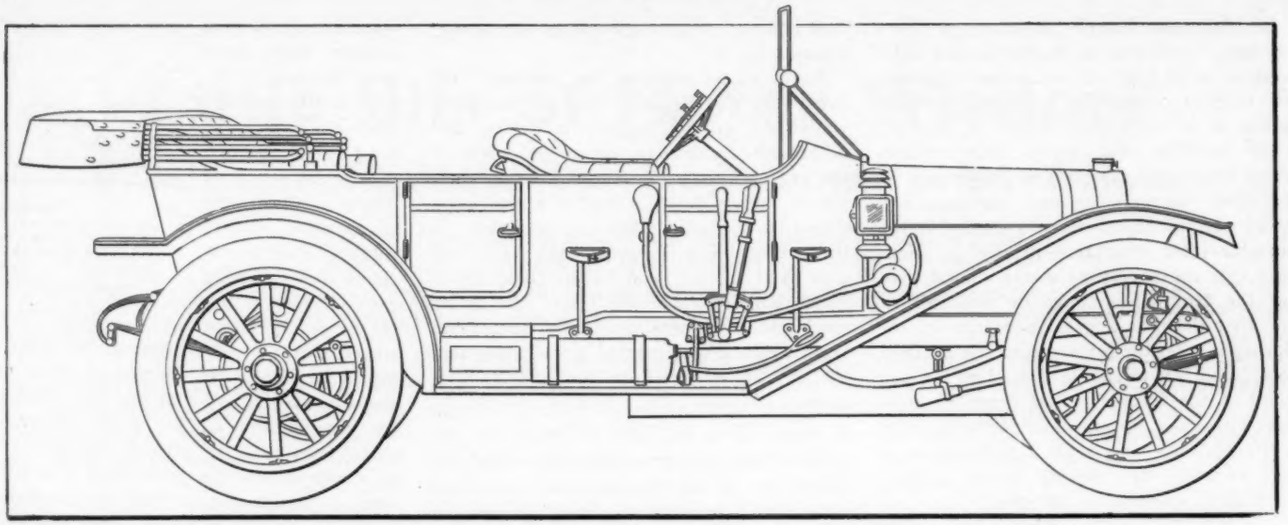


Fig. 1—Right-hand side view of the 50-horsepower Kissel Kar Semi-Touring car showing the general equipment and the disposition of the side levers

Details of the Latest Kissel Kars

Principal Mechanical Features Analyzed

The latest line of Kissel Kars manufactured by the Kissel Motor Car Co. of Hartford, Wis., gives the buyer the choice of four types of chassis with a very complete assortment of bodies. Three models are fitted with four-cylinder motors, the 60-horse-power, however, being fitted with six.

IN order to meet a varied demand the Kissel Kar is made in four types of chassis, commencing with the 30-horsepower runabout, selling at $1,500, to the six-cylinder, 60-horsepower limousine. The outstanding features of the body construction are shown in Figs. 1 and 2, fitted respectively to a 50 and 60-horsepower chassis. The general construction of the various types is uniform, and the motors have the cylinders cast in pairs. Fig. 4 illustrates the motor of 60 horsepower looking at the inlet side. The cylinders are cast in pairs with L-heads, the valves being placed all under one side. The general neatness and clean appearance of the motor is enhanced by the valve covers C1, C2 and C3 which are readily removed by unscrewing a single thumb nut for each cover. The crankcase of the motor is cast from aluminum in two halves. The lower half forms a well and oil is forced from a special tank by a gear-driven pump to every section of the motor. An oil level is provided allowing the flow to be adjusted to meet any condition automatically. The oil pump P is shown on the right-hand side of the motor in Fig. 4 and it will be seen that there is a lead taken direct from the lower half of the base chamber and after passing through the pump the oil is forced back into the motor through the lead O. The shaft driving the pump is operated by means of double

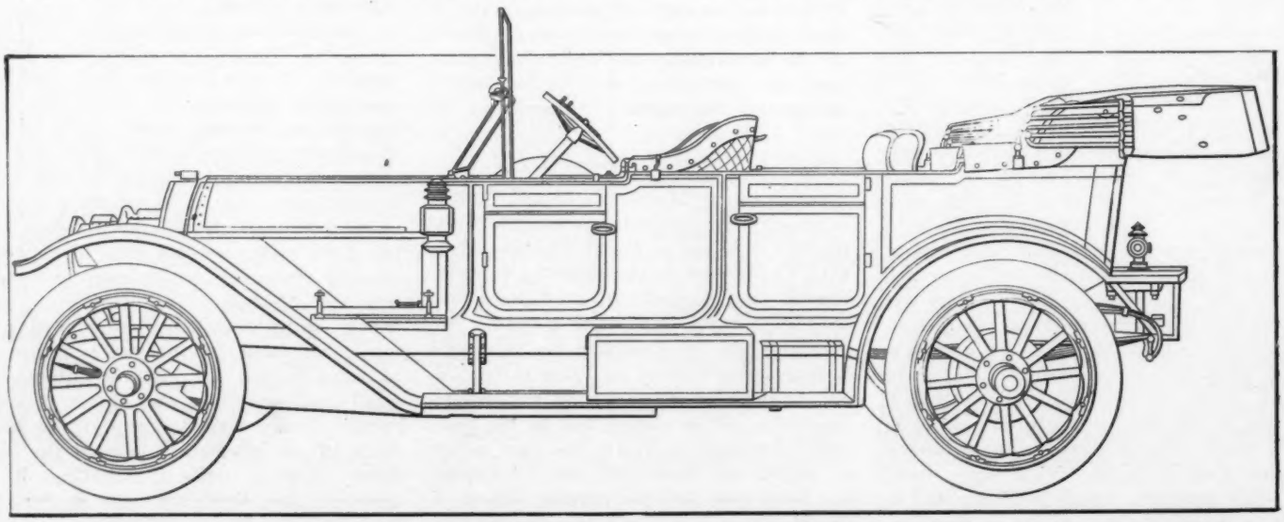


Fig. 2—General appearance of the six-cylinder 60-horsepower touring car with flush-sided fore-door touring body for seven passengers

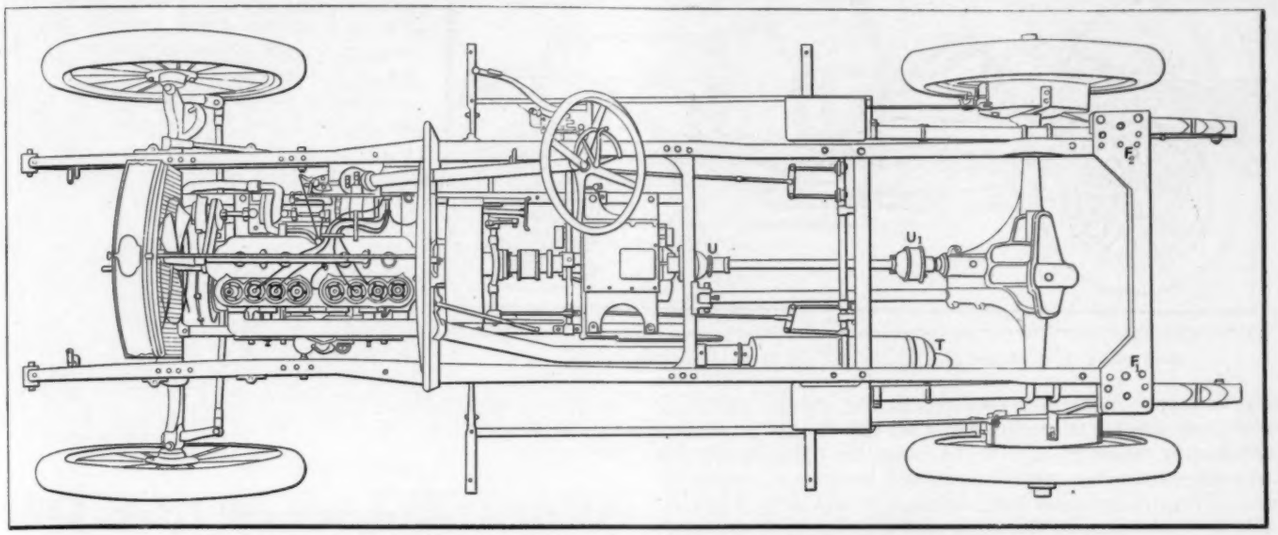


Fig. 2—Plan view of the four-cylinder 40-horsepower chassis showing the general arrangement of the units

gearing off the end of the camshaft and has a split joint to facilitate the removal of the pump without disturbing the gearing.

In addition to grinding the motor parts to size in Kissel motors they are first ground and afterward lapped by a special machine with the part within which it operates. The cylinders of the 60-horsepower motor have a bore of 4 1-2 inches with a stroke of 4 3-4 inches. The intake manifold is branched at three points and is attached to the cylinders by means of brackets B which are held in position by a nut. The same brackets serve to hold the exhaust manifold E in position, but it is possible to remove the intake manifold by undoing the center stud without disturbing the exhaust manifold. The intake manifold at the point where the vertical pipe from the carbureter meets the former is of larger diameter than the remainder of the piping. This allows for a certain degree of expansion and prevents the choking of the gases, which is one of the difficulties to be overcome in carburetion for six-cylinder motors. The water pump is driven by a shaft which carries the fan pulley on the opposite side of the motor, from the half-time gearing, and the water leads W3, W2 and W1 are connected by the piping P2 and P3, whence the water is delivered to the radiator, which is of the tubular type.

The ignition is furnished either by a Mea or Bosch dual system to spark plugs placed over the intake valves. Compression and priming cocks are provided and fitted in the valve covers over the exhaust valves.

The carbureter C is on the float-feed type with the mixing chamber heated by water from the water circulating system.

Passing to the four-cyclinder motor shown in Fig. 6 it is possible to examine the method employed of operating the pump and the magneto. At the base of the cylinder on the right-hand side there is a drain cup C2 which permits the driver to drain all the water from the cylinders in frosty weather. Such a provision, sometimes overlooked, is an absolute necessity and it is essential that drain cups should be placed at the lowest point of the circulation to allow of every drop of water being drawn off. A similar provision is made below the pump. The pump is fitted with two packing glands fore and aft together with greasers, and the extension of the pumpshaft is fitted with an Oldham coupling G1, which permits the magneto M to be removed readily. The magneto M rests on a ledge cast integral with the motor and is held in position by means of a bridge H. The bracket B is bolted to the motor casting and the bolt passes through this and secures the bridge in position above. Studs are provided in the ledge below which fit into countersunk holes in the base of the magneto.

The motor is suspended by four arms which rest on a subframe attached to the main frame, as can be seen by referring to Fig. 3. Stand pipes B1 and B2 in Fig. 6 act as breathers for the motor and at the same time serve for pouring oil into the base chamber.

A cone clutch of the conventional type is utilized to transmit the power from the motor to the transmission, a universal joint being placed between the two members to compensate for any disalignment and unevenness of the road which might cause flexure in the chassis. The subframe that carries the motor is extended rearward and attached to a cross-member of the main frame. A general view of the transmission is shown in Fig. 7, from which it can be seen that the shafts are placed vertically

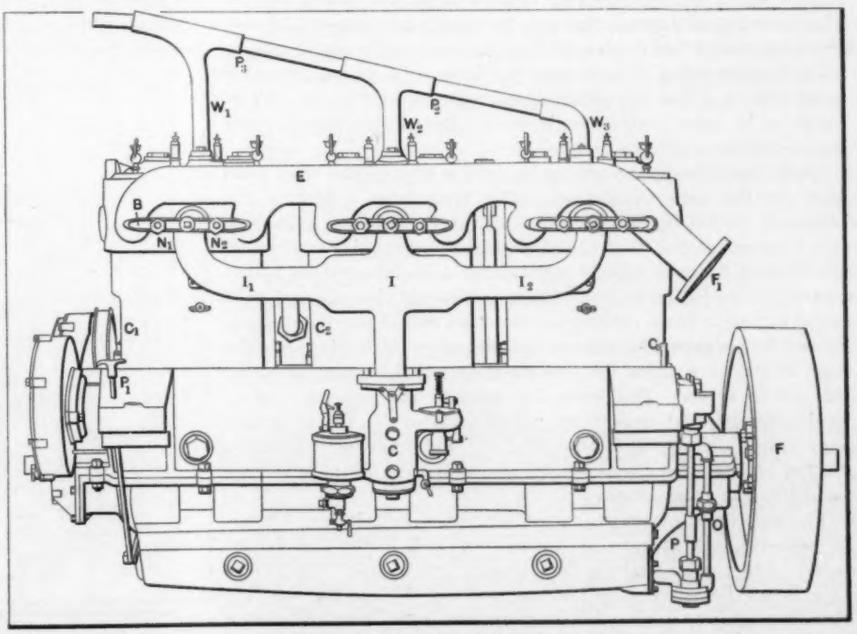


Fig. 4—Left-hand side of the six-cylinder motor showing the carbureter and manifolds together with water pump

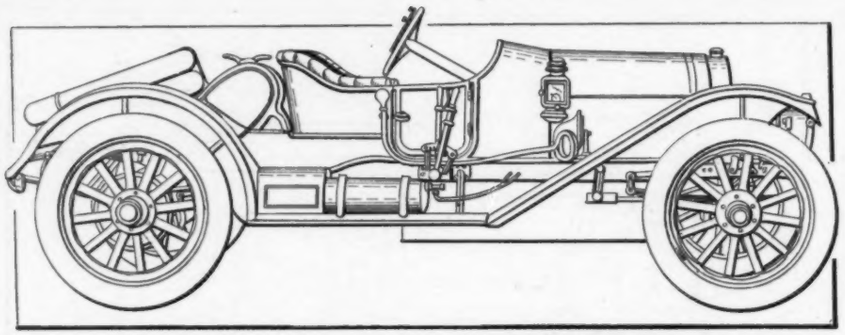


Fig. 5—Right-hand side view of the 30-horsepower semi-racer with gas tank and tires carried on the rear platform

one above the other. The arms A1, A2, A3 and A4 support the aluminum casting from the subframe and the clutch shaft is attached by means of bolts to the flange F1. The primary and secondary shafts are carried upon ball bearings of ample section. The transmission here shown is of the four-speed type as fitted to the 50 and 60-horsepower chassis, but in the 30 and 40-horsepower chassis three speeds obtain. The gear wheel G1 carries a series of dog catches which when engaged with a corresponding set of dogs on the gear G2 forms the fourth speed direct drive or third as the case may be. Gears G1 and G2 serve respectively for the first and second speeds. The gears slide upon a castellated shaft and are moved into position by the lever arms L1 and L2. A cover C is provided at the rear end of the striking arms A to exclude any dirt from this part of the mechanism and to retain the lubricant necessary for easy operation. At the rear end of the gear box attached to the primary shaft there is a flange F2 with arms to take the cross head of the forward universal joint. The propeller shaft, being fitted with two universal joints, one at each end as shown in Fig. 3, is not inclosed and the torque from the live rear axle is taken up by the torque member running parallel to the propeller shaft and terminating at its forward end in a swivel bracket attached to the cross-member frame. The rear end of this member fits into a sleeve of the rear axle and is held in position by means of two bolts. A general idea of the rear axle can be obtained by referring to Fig. 8. It is of the full floating type, the shaft S1 being connected with the dog D1 which engages with the hub of the wheel. The wheels are carried upon roller bearings B1 and B2 which are securely held in position by the locking nuts L. The jaws J1 and J2 accommodate one of the two universal joints and a suspender bar is placed below the axle and is fitted with an adjusting piece B3. The rear side of the axle casing proper is fitted with a cover C1 which when removed allows the differential to be taken out of its housing after the jackshafts have been removed.

Particular attention seems to be paid to one of the most vital parts of the car's mechanism. The method of operating the brakes is shown in Fig. 4, which are of the internal expansion and external constricting types operating upon a drum which is attached to the rear wheels and having a diameter of 14 inches and a width of 5 inches. In order to prevent the external constricting brakes from rubbing on the drum and chattering, springs S2 and S3 are provided and the locking screw A1 holds the brake band in such a position that it cannot exceed the limits of which this screw is set. The lever L1 operates the internal brakes, while the external brakes are taken care of by the lever L3. Fig. 3 shows the method employed for compensating the action of the brakes, the cross bar being carried by short arms attached to the cross-member of the frame.

The wheelbase of the respective models is as follows: Thirty-horsepower, 116 inches; 40 horsepower, 118 inches; 50 horsepower, 124 inches, and 60 horsepower, 132 inches. The front axle is an I-section drop-forging and the connecting bar for the steering arms is placed behind the rear axle. The suspension of the car is taken care of by semi-elliptic springs at the front end and three-quarter elliptic at the rear, the half springs being securely held in position by the frame extensions F1 and F2, shown in Fig. 3.

A neatly designed semi-racer is turned out by the Kissel Company, an illustration of which is shown in Fig. 5. The brake and chain speed levers are placed outside the side doors of the body in order to accommodate the tires of the rear platform; the gasoline tank, which is of oval formation, is placed slightly at an angle.

In the matter of equipment it is the policy of the Kissel Company to include in the purchase price practically everything that the autoist finds it a necessity to have on the car, and on the larger models there should be little else for the purchaser to buy in the way of extras after the car is delivered.

Shock Absorber Idea Old

The idea of a device for arresting the motion of a body gradually and hence without shock is not of very recent origin, but has been used with success in a great many instances where heavy moving weights have to be brought to rest in a short space of time without undue strain.

ONE of the oldest schemes is the shock absorber idea; it had its inception when railroad trains were brought into vogue, and the so-called bumper on a freight car would be incomplete without a shock absorber. In freight-car work, where the shock absorber has to contend with strenuous conditions, there are two principles in common use, on of which depends upon the action of a spring, and the other upon friction. Discussing these two principles, it will be readily appreciated that the spring idea takes into account the desirability of gradually absorbing the energy stored in the moving mass. Spring bumpers produce train oscillations, due to the fact that the springs give back, in a reactive sense, the energy stored in them, and enough work is done in the form of oscillations to absorb the energy of impact of the cars as they bump into each other. That the energy must be absorbed before the cars will be brought to rest is self-evident, but a more quiet way of obtaining the desired result is represented in the form of bumper that dissipates the energy through the medium of friction, which is the

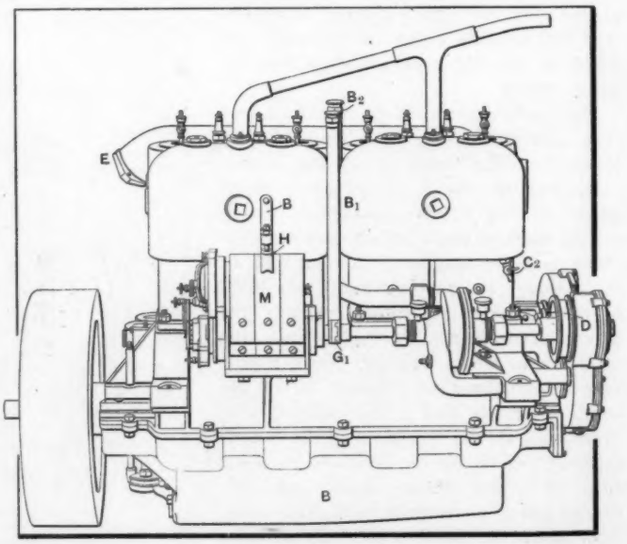


Fig. 6—Magneto side of the four-cylinder motor showing the method of drive and attachment

second principle involved. The friction bumper has no reaction component; all the work is dissipated in the form of heat. As regards the instability of some forms of shock absorbers employed in automobile work, it can only be explained on the ground that the method of utilizing the principle is too frail. If bumpers can be made which will do the work in freight-car practice, involving long trains, surely they can be so contrived that they will serve perfectly in stopping the vertical bounce of the chassis frame and its load as represented in an automobile. Some designers use these absorbers to supplement work that should be performed by the suspension springs, whereas these latter should be made strong enough to do their allotted work without extraneous assistance.

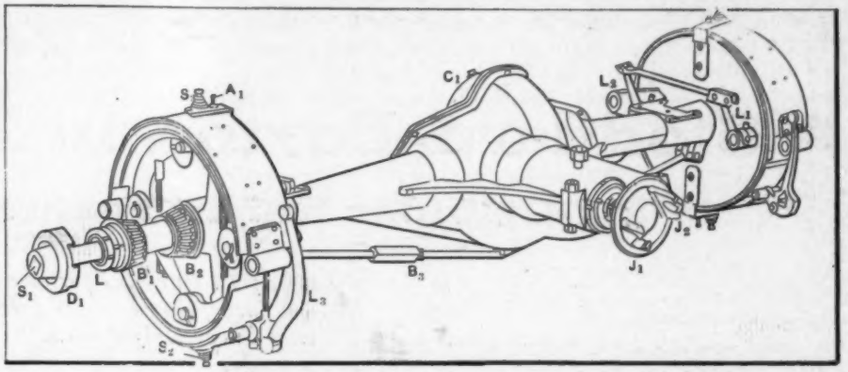


Fig. 8—Live rear axle of the full floating type employed in Kissel Kars

Purpose of the Differential

In turning a curve it is required that one wheel will revolve faster than the other; in order to make this possible the two wheels cannot be on one solid shaft, but will have to be separated by a break. The differential is inserted in this break and makes the difference in speeds practicable.

THE differential gear is fitted, in order to allow one driving wheel to be run faster than the other, in other words, to absorb a greater share of the motion transmitted from the engine, but at all times that driving wheel receives the same amount of push or torque. Even if one wheel should be stationary while the other one is rotated—as when taking a very sharp corner—the push or torque to each wheel remains the same, because the two are connected through the medium of the differential gear, or balance gear as it may more correctly be termed, and, consequently, the turning effort which is applied to the rotating wheel is resisted by an equal and opposite force—the braking effort of the stationary wheel. The relative amount of movement of the two wheels, however, may differ very widely.

The operation of a differential gear, or balance gear, may best be understood if we imagine a man holding a rod by its center and parallel to the back axle, so that its two ends bear against the rear sides of two spokes—the top one in each of the two road wheels on the same axle. If he then pushes the rod forward and, assuming the axle and wheels to be free to move forward in a straight line only, he will transmit an equal amount of motion to each of the road wheels, but, if the axle and wheels are being steered round a corner, and, consequently, one of them requires to run faster than the other, the ends of the rod which acts as a beam will be rotated about the man's hand until they slide out of contact with the spokes of the road wheels. If we substitute for the simple rod a rimless star wheel, consisting of a hub and spokes only, the push of the man's hand may then be more or less continuously transmitted to the wheels, because, as one rod, or diametrically opposite pair of spokes in the star wheel, slides out of engagement with the spoke of the road wheels, another pair of spokes in the star wheel enter into engagement with others on the road wheels. This is practically what happens in the case of the differential gear. The star wheel is carried in a frame, which is driven round the center of the axle, and its spokes mesh with other spokes on the driving wheel.

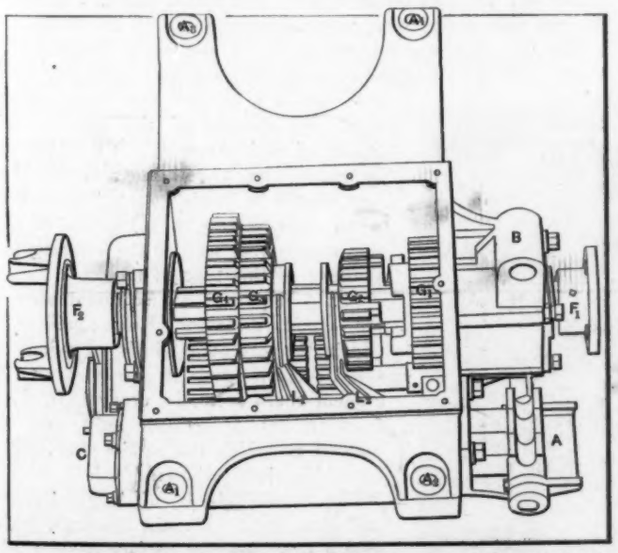


Fig. 7—Plan view of the gear box of the 50-horsepower Kissel Kar, showing the relation of the several members

Harking Back a Decade

TEN years ago a system of steam wagonettes made by the Mobile Company of America was put into service in New York City. The wagonettes plied between the Cortlandt and Wall street ferries and at the time the project was hailed with much acclaim as an improvement on one phase of New York's rapid transit. The enterprise has been so long forgotten that few residents even remember that it ever existed.

Experiments with motor-driven farm machinery and military wagons were being pursued.

The case of the original joy rider was noted when an employee of a Cleveland establishment used one of the firm's electric cars to give some of his lady friends a good time.

The idea of installing a carbureter for each cylinder was being gravely discussed.

The sporting section of motordom had its attention centered on the Newport Road race on the Ocean Drive. This race was later prohibited by the Rhode Island courts and was run off in Aquidneck Park, the winner turning up in W. K. Vanderbilt's Daimler, called the "Red Devil."

Ralph Estep wrote an essay on "Brazing Automobile Frames" in *The Motor Review* that reads like an account of modern practice.

Miles T. Baird and party motoring through the Yosemite valley found much hostility along the way.

GRAVITY FEED TANKS—In gravity feed work the gasoline tank must be located at least one foot above the float bowl of the carbureter, which condition is independent of every other consideration. In pressure feed work the gasoline tank is located below the deck of the body, and generally below the top of the chassis frame. Round or oval tanks are preferred; walls without curves bulge out unless they are braced by means of surge plates, of which two are used in most tanks. The tank generally conforms to the space provided by each type of chassis.

Stoddard-Dayton in Perspective

Six-Cylinder Knight Features the Line

In addition to several successful cars of the past season the Dayton Motor Car Co., of Dayton, Ohio, has incorporated in the forthcoming season's list of models a new car fitted with Silent Knight motor.

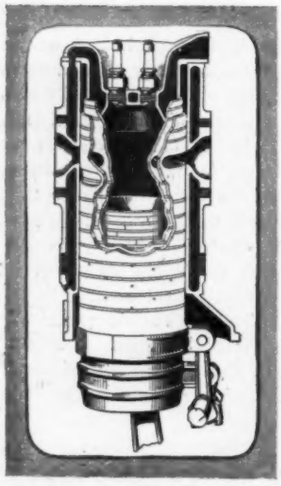


Fig. 1—Section through a cylinder of the Stoddard-Dayton Knight motor

THE Stoddard-Dayton-Knight as adopted by the Dayton Motor Car Co., has a motor fitted with six cylinders of 4 1-2-inch bore and 5 1-2-inch stroke. The general principle of the Knight motor is sufficiently familiar by this time, so that no useful purpose can be gained by going into the details of the motor. The sectional view shown in Fig. 1 gives a concise idea of the co-relation of the sliding sleeves at the moment of induction with the intake ports in register. The piston has a concave head, and the compression chamber being similarly formed, pocketing is entirely eliminated and the maximum effect of the explosion is thereby obtained.

It will be noticed that two spark plugs are fitted to each cylinder and it is possible, as will be shown later, to cause the spark to take place at both spark plug points practically simultaneously. The water jacketing, as can be seen from the illustration, is well taken care of, there being no protruding points likely to cause auto-ignition.

Although the piston has a stroke of 5 1-2 inches it is scarcely this so far as its friction is concerned because the sleeve moves down 1 1-8 inches. This facilitates lubrication and reduces wear on the side of the sleeve. On the compression stroke both inner and outer sleeves go up with the piston, the inner sleeve moving the faster. On the exhaust and induction strokes the sleeves move in an opposite direction to the piston; but on these strokes there is very little work being done by the piston and consequently there is a minimum of side thrust. The sleeves descend with the piston on the working or explosion stroke when the piston has the greatest amount of side thrust against the sleeve, thereby eliminating to a certain degree some of the thrust.

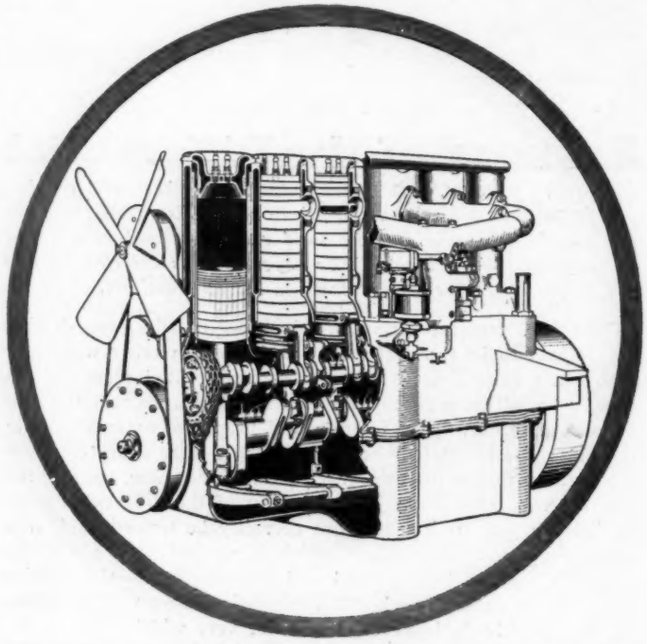


Fig. 3—Part sectional view of the Stoddard-Dayton six-cylinder Knight motor

The up-and-down movement of the sleeves is comparatively short. The piston stroke of 5 1-2 inches gives a piston speed of 916 feet per minute and 1,000 revolutions per minute of the motor. The stroke of each sleeve is 1 1-8 inches and its speed is but 93.7 feet per minute. This fact should be borne in mind by skeptics when endeavoring to solve the lubrication question as well as the wearing possibilities of this type of motor.

Fig. 3 shows a part sectional view of the Stoddard-Dayton Knight motor in which the eccentric shaft carrying the small eccentric rods is shown, driven by a silent chain from the crankshaft. Each cylinder has a separate port and the method in which the intake manifold is formed is clearly shown.

The crankshaft is of large diameter and runs in seven main bearings, which give a large bearing surface besides adding stability to the motor. In the upper half of the crankcase there are core ways

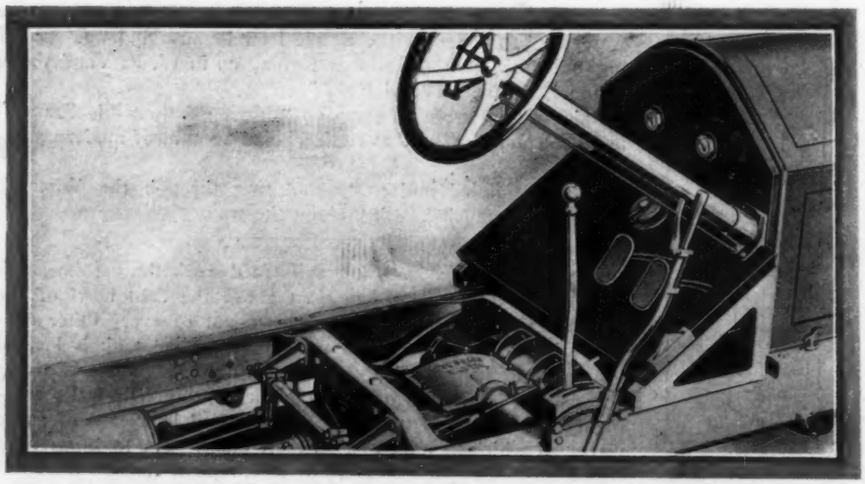


Fig. 2—Stoddard-Dayton chassis mid-section, showing control, clean dash and transmission

to which the air enters before reaching the carbureter. This serves two purposes, as the air is warmed passing through the base and the sound of inrushing air which prevents an otherwise quiet motor from performing silently is eliminated.

The lubrication of the Knight motor is effected by means of six troughs located transversely beneath the six connecting rods. The troughs are carried at one end on a boss shaft which is connected with the throttle. When the throttle is opened, which raises the troughs, the scoops on the ends of the connecting rods slip deep into the oil, thereby atomizing it and bathing the lower ends of the sleeves, whence the oil finds its way into the grooves cut in the sleeves shown in Fig. 1. The sleeves are drilled so that the oil can pass from one sleeve to the other. The troughs are kept replenished to overflowing by means of an oil pump situated at the base of the motor, and

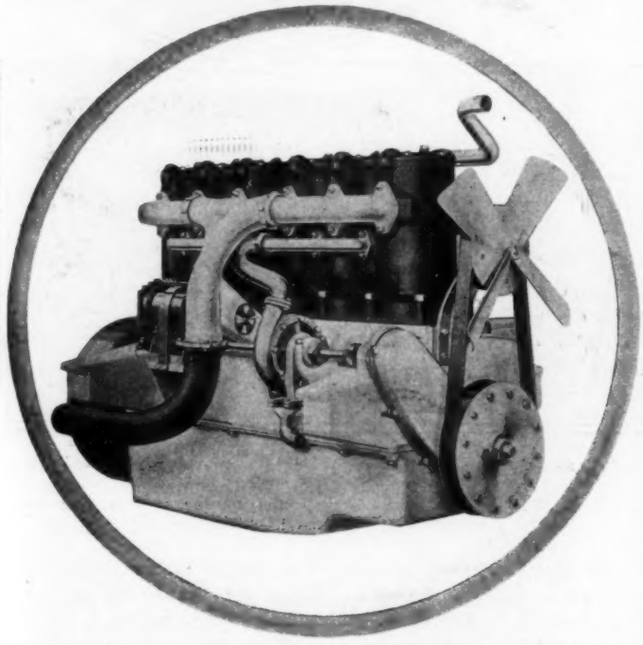


Fig. 4—Exhaust side of the 6-cylinder Stoddard-Dayton Knight motor, showing the water pump and magneto

by means of an adjustment it is possible to maintain the feed of oil to the speed requirements of the motor. A level gauge is fitted at the rear end of the motor to show the amount of oil in the sump.

Fig. 4 shows the right-hand side of the motor, disclosing the separate-ported exhaust manifold, the centrifugal water pump and the high-tension magneto, which are driven by means of a silent chain in a similar manner to the eccentric shaft. An air passage will be noticed partially surrounding the exhaust manifold, which conducts air through the cored passageway in the base chamber to the carbureter. A rotary shutter is provided so that the temperature of the air may be regulated and cold air admitted if found desirable. The front end of the crankshaft is extended through the base chamber and attached thereto with a pulley which drives a heavy 1 1-2-inch flat belt which in turn operates the four-bladed solid cast aluminum fan. The fan runs on annular ball bearings, carried in an eccentric collar so that adjustment of the tension of the belt can readily be made. The front of the crankshaft is equipped with a damper in order to overcome any tendency of uneven running of the motor at high engine speeds.

The ignition is furnished to the spark plugs from a two-spark high-tension ignition system controlled by the one switch and coil on either magneto or battery through two sets of plugs. The carbureter is of the constant-level automatic type, the mixing chamber of which is heated by a circulation of warm water. The auxiliary air valve is provided with an adjustment controlled by a short lever on the steering post, which allows variations to be made while the car is running, thereby placing at the driver's disposal a ready and certain means to meet the daily variations in temperature, humidity, and so on.

Fig. 8 shows the Stoddard-Dayton valve-in-the-head motor, the salient external features of which are apparent from the illustration. Heretofore the expulsion of exploded gases has been dependent in a large measure upon the movement of the piston, but as the compression chamber cannot be entirely scavenged by the piston a certain residue of the burnt gases always remains behind which intermingles with the fresh gases that are taken in on the induction stroke. In order to overcome this a multiple manifold is provided, and within the outer exhaust manifold are various pipes and chambers so designed that when one cylinder is exhausting the action forms a suction in the pipe of the next cylinder to be exhausted. The right-hand side of the valve-in-the-head motor can be seen by referring to Fig. 10 Independent camshafts are provided for the inlet and exhaust valves and the method of operating the valves can be seen in the illustration.

In order to differentiate between the various models manufactured by this concern names have been chosen for the different types of chassis instead of letters. The "Special" is a 58-horsepower chassis, four-cylinder, 5-inch bore by 5 1-2-inch stroke, and has a wheelbase of 130 inches for the touring and limousine bodies and 122 1-2-inch wheelbase for the four-passenger torpedo and two-seated roadster. The "Saybrook" model has a motor of 48 horsepower, the bore 4 3-4 with 5-inch stroke and a wheelbase of 122 1-2 inches. The "Stratford" model is fitted with a 38-horsepower motor with L-head motor, the cylinders being 4 1-8-inch bore and the stroke 5 1-4 inches, the wheelbase of the chassis being 114 inches. The "Savoy" model is fitted with an L-head motor, the cylinders of which are 4-inch bore and 4 1-2-inch stroke, with 112-inch wheelbase. The smallest model manufactured is the "Courier" chassis, with a 30-horsepower motor, 3 3-4 inches bore and 5 1-8-inch stroke. the wheelbase of the chassis being 106 inches. The various chassis are fitted with an exceptionally complete line of body work, a few examples of which are shown in the accompanying illustrations. The chassis particulars of the "Knight," "Special," and "Saybrook" models are identical. The clutch fitted to Stoddard-Dayton cars on these models is of the leather-faced cone type, the cone being of cast aluminum faced with leather

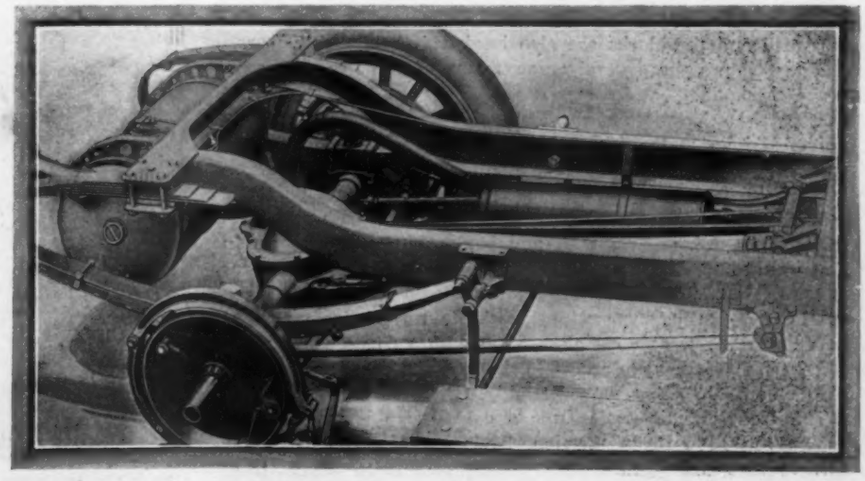


Fig. 5—Rear construction of the Stoddard-Dayton "Special," showing the elliptic springs and frame

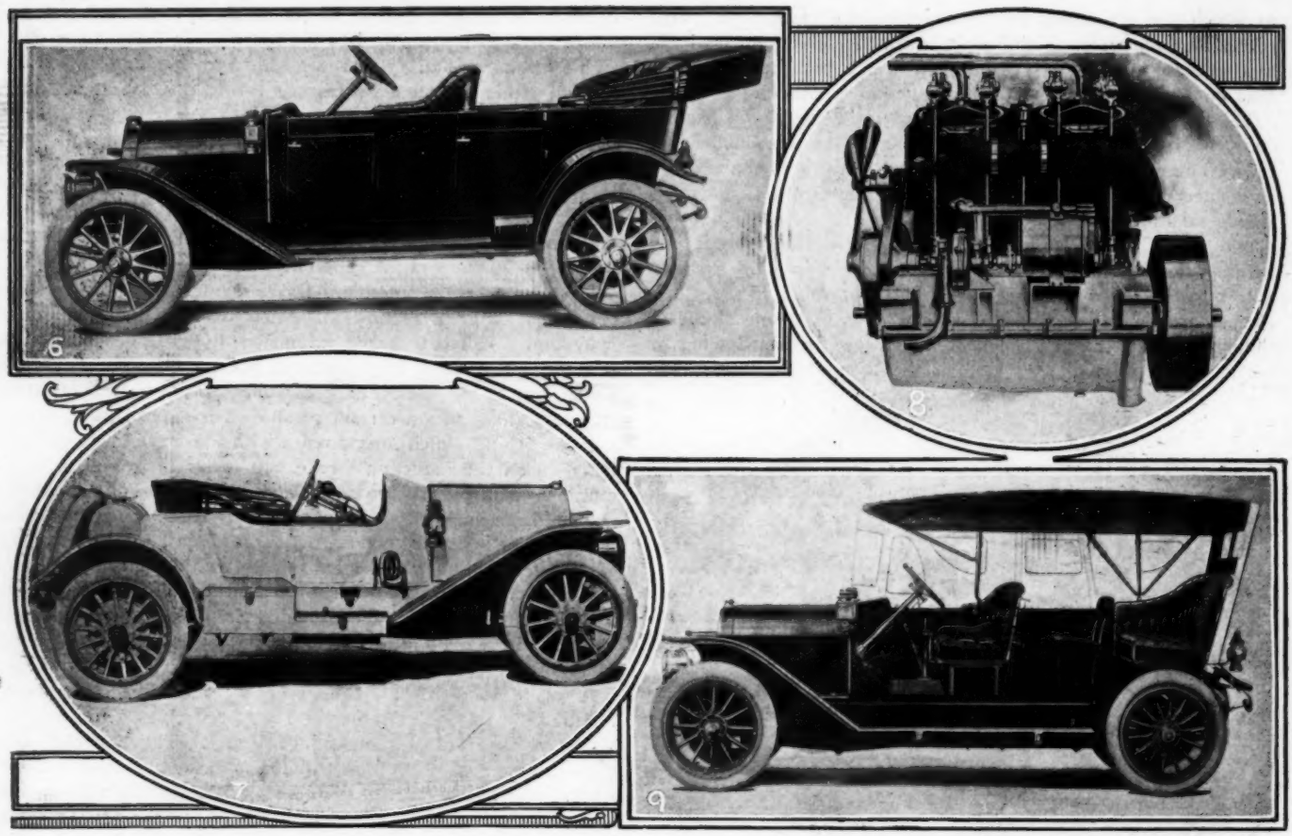


Fig. 6—General appearance of the Stoddard-Dayton "Savoy" type of touring car

Fig. 7—Stoddard-Dayton compartment torpedo with dust and waterproof luggage compartment

Fig. 8—Exhaust side of the Stoddard-Dayton valve-in-the-head motor, showing the multiple exhaust manifold

Fig. 9—Side view of a Stoddard-Dayton touring car, showing roominess for the occupants of all seats

and backed by a large number of flat flexible springs to cause the leather to raise in spots, thereby giving a gradual operation and eliminating shocks to the transmission through careless engagement. Ball bearing thrusts are used inside and out and the clutch spring is self-contained, eliminating end thrusts on the crankshaft while the motor is running. A general idea of the appearance of the transmission gear, shift lever, pedals and control is given in Fig. 2. The transmission is of the selective type, giving three speeds forward and one reverse, the shafts being carried upon double annular ball bearings; steam type packing glands are employed, which permit the use of a thin lubricant without the fear of leakage through the bearing housings. Between the clutch and transmission there is a double sliding universal joint, the casing of which is drop forged and hardened and the blocks are also hardened to eliminate wear.

Fig. 5 shows the general arrangement of the live rear axle, brake mechanisms and torque rods. The propeller shaft connecting the transmission to the bevel gearing is fitted with a universal joint at the forward extremity and is supported by a torsion tube which is held in its front end in a bolt joint allowing sliding motion fore and aft in addition to its universal movement. Radii rods are fitted at each end with universal joints, thus doing away with any binding or cramping action that would impede their proper functioning or cause undue wear and rattling. The axle of the three above-mentioned models is of the full-floating type with jackshafts turned from chrome nickel steel. The axle casing is fitted with a cover which when removed gives complete access to the working parts and permits the differential to be removed readily.

The front axle is made from a cold drawn bar of what is known as "Plow-Beam" section, having reinforcements at the corners to guard against the twisting strains to which front axles are subjected.

Shock absorbers are regular equipment of the "Knight," "Special" and "Seabrook" models. Two sets of brakes are provided, operating upon the drums attached to the rear wheels and forming part of the hub flange. The drums are 14 inches in diameter on the "Saybrook" model and 16 inches in diameter on the "Special" and "Knight" models. The external brake has a two-part, forged steel, I-shaped band 2 1-2 inches wide, hinged and

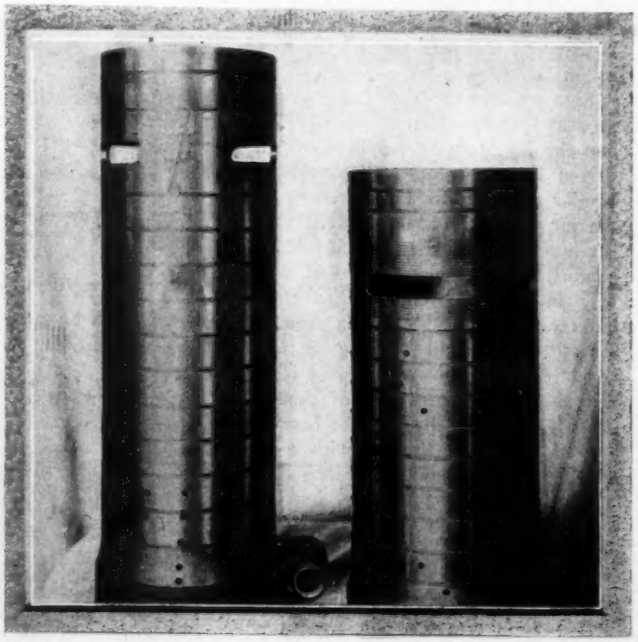


Fig. 14—General view of the inner and outer sleeve, showing method of slotting and diagonal drilling for lubrication

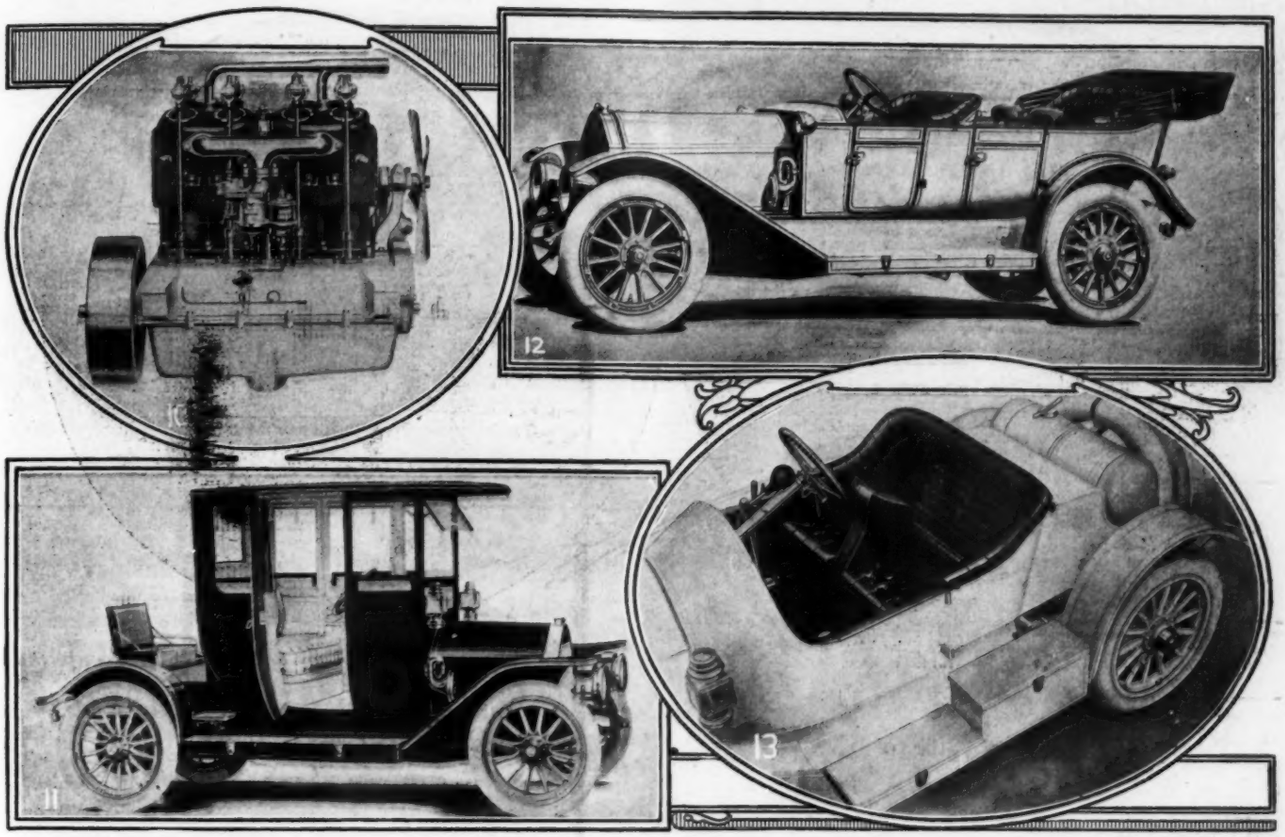


Fig. 10—Intake side of the Stoddard-Dayton valve-in-the-head motor, showing the carbureter with special air valve regulated by lever from the steering post

Fig. 11—Stoddard-Dayton "Stratford" three-passenger coupé

Fig. 12—Flush sided seven-passenger body, fitted to a Stoddard-Dayton-Knight chassis

Fig. 13—Interior view of Stoddard-Dayton compartment torpedo, showing accessibility of luggage space

faced with raybestos. All connecting rods are now placed on the inner side of the frame and the brake adjustment is made by means of turn buckles, which are easily accessible, as they lay directly beneath front floor boards. The suspension of the car is taken care of by 3-4 elliptic springs at the rear and semi-elliptic springs at the forward end, the leaves being 2 1-2 inches in width. The spring bolts have large diameters and are fitted with grease cups. The frame is on the pressed steel type of U section, pressed cold from a medium carbon steel, the stock being 3-16 of an inch with 2 1-4 inch flanges. In order to eliminate body squeaks and vibration the bodies are set on rubber bumpers in the frame.

The radiator is of the cellular type, with distributing manifold for spreading the water to the sides as well as to the center of the cooling core.

In the three models under notice the front seats are entirely separate from the body and are adjustable forward and back, giving drivers of various leg lengths a means of adjustment. The 2-passenger car shown in the illustration, in which the compartment is of sufficient size to carry two suit cases, is a distinct innovation.

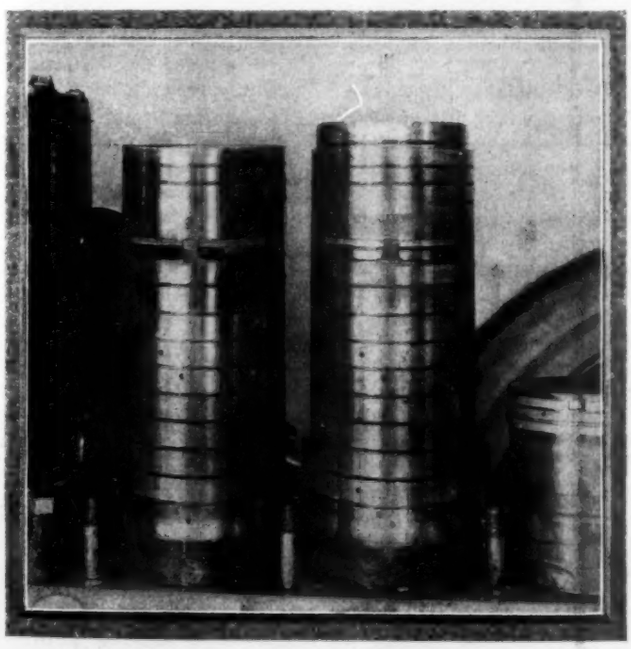


Fig. 15—Appearance of sleeves of Stoddard-Dayton-Knight motor, exhaust side, after having run three thousand miles

Stoddard-Dayton at Close Quarters

The staff man of THE AUTOMOBILE had an opportunity, thanks to the courtesy of the manager of the New York branch of the Dayton Motor Car Company, of inspecting the first six-cylinder Knight motor that had been manufactured in America.

The front block of cylinders was dismantled, which gave an opportunity of inspecting the various working parts after the car had run a matter of 3,000 miles. The photographs of the parts shown in Figs. 14 to 19 show the state of the motor better than words can express it. It was not expected that any wear would take place in so short a distance, but what it did show was that a perfect film of oil is maintained between the various surfaces and that discoloration of the ports was a negligible quantity.

It may be mentioned incidentally that the Stoddard-Dayton

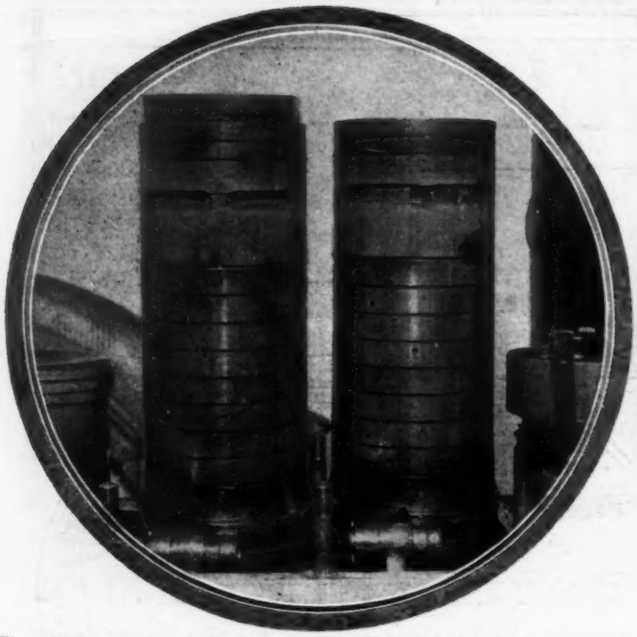


Fig. 16—Appearance of the sleeves of the Stoddard-Dayton-Knight motor, intake side, after having run three thousand miles

Fig. 18—Exhaust side of Stoddard-Dayton-Knight motor, showing central web in the passage-way forming a support for connecting piece in sleeve

Knight motor is the longest stroke motor of this type that has so far been manufactured by any of the companies who build motors under the Knight patents. Fig. 14 shows a general view of the inner and outer sleeves. The method of ringing the sleeves in the form of circular grooves can be seen so that the lubrication will be properly taken care of and prevent an excess of oil being carried up into the combustion chamber. Each of the sleeves has been drilled to permit the lubricant to freely circulate, and as the outer sleeve is the longer of the pair this has been drilled with holes set diagonally to the axis of the piston in the manner shown in the illustration. Another feature of the sleeves can be seen in the vicinity of the longer or outer sleeve port. Small slots are cut radially above and below the port which in time collect a certain amount of the carbon deposit and tend to keep the cylinder port free from any foreign matter.

A slight idea of this can be seen by referring to Fig. 15, which shows two of the sleeves on the exhaust side of the motor after the cylinders had been removed. Again, referring to Fig. 16, the appearance of the sleeves on the intake side shows an absolutely clean surface, the polish left by the grinding machine being still discernible. The valve timing of this motor is particularly worthy of notice as it varies from previous Knight practice. The intake valve opens on top dead center and closes 40 degrees after lower dead center, while the exhaust valve opens 50 degrees before lower dead center and closes 12 degrees after top dead center, which allows a lapping of the two valves of 12 degrees.

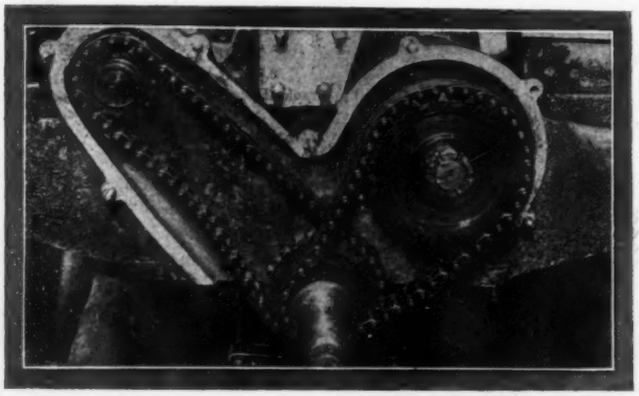


Fig. 19—Silent-chain drive employed on the Stoddard-Dayton-Knight motor

The external appearance of the cylinders of the motor, which are cast in two blocks of three each, do not adequately show the size of the ports; but there is a considerable difference in the shape of the intake and exhaust ports. Fig. 17 shows the intake ports, which consist of a straight slot, circular in form, which cannot be shown in a photograph as the casting at this point tapers outward, allowing the slot in the cylinder to register the same size as the slots in the sleeves. It will be noticed in Fig. 15 that there is a slight rib placed in the middle of the slots, which registers with the web in the port shown in Fig. 18. This rib is of lesser diameter than the sleeve and consequently does not rub either against the piston or the cylinder wall. The width of the slot is 9-16 of an inch, which has been found the best working dimensions for this size of motor. In order to overcome the inconveniences that sometimes attend the proportionate flow of gas from the carbureter to the cylinders the induction manifold has been cast with internal baffle-plates, thereby distributing the gases evenly to the separate ports.

A point that was first of all extensively adopted in the Knight motor is shown in Fig. 19. In this illustration the method of driving the eccentric, pump and magneto shafts is shown. Two sprocket wheels are attached to the extension of the crankshaft and the two silent chains drive the sprocket wheels that are attached respectively to the eccentric and pump shafts. These chains run continually in a bath of oil and besides being silent in operation, should offer very little wearing possibilities.

Left-hand driving has been incorporated in the Knight Stoddard-Dayton car and the change speed and brake levers are located on the right hand side of the driver. The electric lighting system, that is a regular feature on this car, is driven by a silent chain from the shaft that is situated between the clutch and the transmission. By removing the floor boards immediate access is obtained to this part of the equipment and its location leaves the motor surroundings entirely free. The piston rings of this motor differ from conventional practice; the grooves in the piston and cylinder head are fitted with two independent rings, the inner one being slightly eccentric, while the outer is cylindrical. Besides the general features already outlined, several minor improvements are worthy of notice. A neat arrangement is provided for altering the timing of the magneto with-

out disturbing the distribution gear. The water piping and tubing that carry the ignition wires are neatly executed and removable by simply loosening the nuts instead of having to take them off entirely. Pressure for the gasoline tank is derived from a small pump driven by a short arm off the eccentric shaft, in which case only atmospheric air is employed and filtration eliminated.

Program for Old Orchard Meet

OLD ORCHARD, ME., Aug. 21—W. T. Kincaid, who is promoting the motor races on Old Orchard beach for next month beginning Labor day, has mapped out a program covering three days' racing. There are 17 events on the list divided up according to the A. A. A. rules. The first two days have six each with five on the third day. Cash prizes will be given in the greater number of the events, there being one amateur contest scheduled. The list of events follow:

FIRST DAY, SEPTEMBER 4.

Event 1, Class C—Non-stock, 161 to 230, 5 miles, entry fee $10, prize $50.
2, Class B—Stock chassis, 231 to 300, 10 miles, entry fee $10, prize $50.
3, Class D—Free-for-all one-mile time trials, no entry fee, prize $50.
4, Class B—Stock chassis, 451 to 600, 10 miles, entry fee $10, prize $50.
5, Class E—Special amateur event, 5 miles, open to any car privately owned, owner to drive, entry fee $5, prize trophy.
6, Class D—Free for all, 10 miles, entry fee $15, prize $100.

SECOND DAY, SEPTEMBER 5.

Event 1, Class B—Stock chassis, 161 to 230, 5 miles, entry fee $10, prize $50.
2, Class C—Non-stock, 451 to 600, 10 miles, entry fee $10, prize $50.
3, Class D—Free-for-all, one-mile time trials, no entry fee, prize $50.
4, Class B—Stock chassis, 301 to 450, 10 miles, entry fee $10, prize $50.
5, Class C—Non-stock, 231 to 300, 5 miles, entry fee $10, prize $50.
6, Class D—Free for all, 10 miles, entry fee $15, prize $100.

THIRD DAY, SEPTEMBER 6.

Event 1, Class E—Stock chassis under 301 cubic inches, 5 miles, entry fee $10, prize $50.

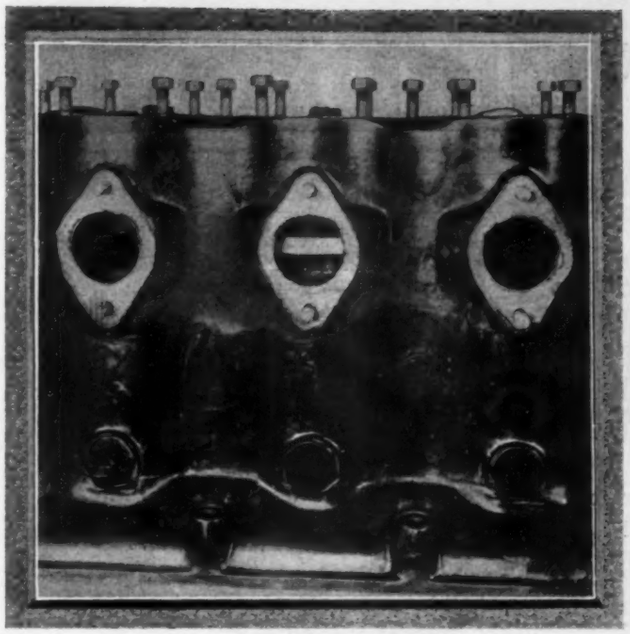


Fig. 17—General appearance of the three-block cylinder, showing the intake ports with the manifold and cylinder heads removed

2, Class E—Stock chassis, 301 to 600 cubic inches, 10 miles, entry fee $10, prize $50.
3, Class D—Free-for-all one-mile time trials, no entry fee, prize $50
4, Class D—Free for all, 10 miles, entry fee $15, prize $100.
5, Class E—Non-stock under 600 cubic inches, 25 miles, entry fee $20, prizes $100 to first and $25 to second.

Calendar of Coming Events

Handy List of Future Competitive and Show Fixtures

Shows

Jan. 1-5, 1912.....New York City, Grand Central Palace, Annual Show, Automobile Manufacturers' Association of America.
Jan. 6-13.....New York City, Madison Square Garden, Twelfth Annual Show, Pleasure Car Division, Automobile Board of Trade.
Jan. 10-17.....New York City, Madison Square Garden, Annual Show, Motor and Accessories Manufacturers.
Jan. 10-17.....New York City, Grand Central Palace, Twelfth Annual Show, National Association of Automobile Manufacturers.
Jan. 15-20.....New York City, Madison Square Garden, Twelfth Annual Show, Commercial Division, Automobile Board of Trade.
Jan. 27-Feb. 10....Chicago Coliseum, Eleventh Annual Automobile Show under the auspices of the National Association of Automobile Manufacturers.

Race Meets, Runs, Hill-Climbs, Etc.

Aug. 25-26.....Elgin, Ill., Stock Chassis Road Race, Chicago Motor Club.
Sept. 1.....Oklahoma, Reliability Run, *Daily Oklahoman.*
Sept. 2.....Pottstown, Pa., Track Races, South Jersey Motor Club.
Sept. 2.....Scranton, Pa., Track Races, Automobile Association of Scranton.
Sept. 2, 3, 4.....Kansas City, Mo., Track Races, Automobile Club of Kansas City.
Sept. 2-4.....Amarillo, Tex., Track Races, Panhandle Auto Fair Association.
Sept. 2-4.....Brighton Beach, N. Y., Track Races.
Sept. 3.....Columbus, O., 200-mile Race, Columbus Automobile Club.
Sept. 4.....Denver, Col., Track Races, Denver Motor Club.
Sept. 4.....Salem, N. J., Track Races, South Jersey Motor Club.
Sept. 4, 5, 6.....Old Orchard, Me., Beach Races, Old Orchard Automobile Association.
Sept. 6-9.....Buffalo, N. Y., Grade I, Reliability Run, Automobile Club of Buffalo.
Sept. 7-8.....Philadelphia, Track Races, Philadelphia Auto Trade Association.
Sept. 8-9.....Hamline, Minn., Track Races, Minnesota State Automobile Association.
Sept. 9.....Augusta, Me., Hill Climb.
Sept. 9.....Cincinnati, O., Road Race, Fern Bank Dam Association.
Sept. 9.....Hartford, Conn., Track Races, Connecticut Fair Association.
Sept. 9.....Port Jefferson, L. I., Hill Climb, Port Jefferson Automobile Club.
Sept. 9.....Riverhead, L. I., Road Race, Port Jefferson Automobile Club.
Sept. 13.....Grand Rapids, Mich., Track Races, Michigan State Auto Association.
Sept. 15.....Knoxville, Tenn., Track Races, Appalachian Exposition.
Sept. 16.....Philadelphia (Point Breeze), Track Races, Philadelphia Automobile Trade Association.
Sept. 16.....Syracuse, N. Y., Track Races, Automobile Club and Dealers.
Sept. 18-20.....Chicago, Ill., Commercial Reliability Run, Chicago Motor Club.
Sept. 19.....Burlington, Vt., Reliability Run, Merchants' Protective Association.
Sept. 23-25.....Detroit, Mich., Track Races, Michigan State Agricultural Society.
Sept. .....Denver, Col., Track Races, Denver Motor Club.
Sept. .....Detroit, Mich., Reliability Run, Wolverine Automobile Club.
Sept. .....Steubenville, O., Hill Climb, Automobile Club of Jefferson County.
Oct. 6-13.....Chicago, Ill., Thousand-Mile Reliability Run, Chicago Motor Club.
Oct. 7.....Danbury, Conn., Track Races, Danbury Agricultural Society.
Oct. 7.....Philadelphia, Fairmount Park Road Races, Quaker City Motor Club.
Oct. 7.....Springfield, Ill., Track Races, Springfield Automobile Club.
Oct. 13-14.....Atlanta, Ga., Track Races.
Oct. 14.....Santa Monica, Cal., Road Races.
Oct. 14 to 25.....New York City, Start of the Annual Glidden Tour, en route for Jacksonville, Fla.
Oct. 16-18.....Harrisburg, Pa., Reliability Run, Motor Club of Harrisburg.
Nov. 1.....Waco, Tex., Track Races, Waco Auto Club.
Nov. 2-4.....Philadelphia, Reliability Run, Quaker City Motor Club.
Nov. 4-6.....Los Angeles-Phoenix Road Race, Maricopa Auto Club.
Nov. 9.....Phoenix, Ariz., Track Races, Maricopa Automobile Club.
Nov. 9, 11, 12.....San Antonio, Tex., Track Races, San Antonio Auto Club.
Nov. 27.....Savannah, Ga., Vanderbilt Cup Race, Savannah Automobile Club.
Nov. 30.....Los Angeles, Cal., Track Races, Motordrome.
Nov. 30.....Savannah, Ga., Grand Prize Race, Savannah Automobile Club.
Nov. .....Columbia, S. C., Track Races, Automobile Club of Columbia.
Dec. 25-26.....Los Angeles, Cal., Track Races, Motordrome.

THE AUTOMOBILE

Vol. XXV Thursday, August 24, 1911 No. 8

THE CLASS JOURNAL COMPANY
H. M. SWETLAND, President
A. B. SWETLAND, General Manager
231-241 West 39th Street, New York City

EDITORIAL DEPARTMENT
GEORGE M. SCHELL
JAMES R. DOOLITTLE HUGH P. MacCONNELL
J. EDWARD SCHIPPER HANS WEYSZ

ADVERTISING DEPARTMENT
W. I. RALPH, 1035 Old South Bldg., Boston LOUIS R. SMITH, New York
C. H. GURNETT, L. G. VOGEL, 910 South Michigan Avenue, Chicago FRANK B. BARNETT, 309 Park Building, Cleveland
T. B. VAN ALSTYNE, New York and Phila. H. H. GILL, 627 Ford Building, Detroit
H. L. SPOHN, New York

Cable Address - - - - - - - - - - - - - - - - Autoland, New York
Long Distance Telephone - - - - - - - - - - 2046 Bryant, New York

SUBSCRIPTION RATES
United States and Mexico - - - - - - - - - - - - - - One Year, $3.00
Other Countries in Postal Union, including Canada - - - - One Year, 5.00
To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order, or Register your letter.

FOREIGN SUBSCRIPTION AGENTS
ENGLAND:—W. H. Smith & Sons, Ltd., 186 Strand, London, W. C., and all bookstalls and agencies in Great Britain; also in Paris at 248 Rue de Rivoli.
FRANCE:—L. Baudry de Saunier, offices of "Omnia," 20 Rue Duret, Avenue de la Grande Armee, Paris.
GERMANY:—A. Seydel, Mohrenstrasse 9, Berlin.

Entered at New York, N. Y., as second-class matter.
The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

CLEAN UP NEW YORK STATE

SEPTEMBER 1 has been selected as housecleaning day for the State of New York. On that date the new law, making it a misdemeanor to post bills on trees, stumps, posts. fences, stones and hundreds of other places without the permission of the property owner, goes into effect. On the same day it has been suggested that everybody interested in the future welfare of the Empire State use his or her influence for the general improvement of the appearance of the countryside, the small villages, the towns and even the cities.

Housecleaning New York State is not any child's play. In some places trees have been covered from the roots as high up the trunk as the energetic bill poster has been able to reach; every old building near the highway has been converted into a crazy-quilt advertising sign; every corner fence has been covered.

To remove all this débris will require energy; it will require co-operation, and it will require organization. Spasmodic mixtures of printers' ink disfiguring a beautiful landscape do not add to the joy of the automobilists outing, and now that the State has taken the matter in hand it is up to the automobile owners to get together and help the good work along.

The best way for the automobilists is to get busy at once. September 1 will be pretty late. Get the enthusiasm, at least, worked up before that date. The New York State Association should take the lead. To every one of its affiliated clubs should go out a letter advising them of the housecleaning program and requiring them to organize at once a housecleaning committee. Where clubs do not exist the enthusiasm must be stirred up and transferred into action. This can be done by communicating with the leading automobile people in such sections through the press.

With the citizens of our State this work should be looked upon as an investment and not an expense. The cleaning up of the State will advertise it from one ocean to the other; the cleaning up of the State will increase the pride that every resident should have in his State; this cleaning up will bring tourists to our valleys, our lakes and our mountain sections who have never been to them before.

September 1 brings into force one other good law in New York State, namely, protection to roadside signs which have for their object warning on steep hills, warning for sharp and dangerous curves, warning for dangerous railroad crossings, as well as ordinary direction signs to towns and cities. For years there has been much malicious destruction of sign boards erected by the many enterprising clubs throughout New York and other States. To date there has been little hope of hunting down the offenders. The new law provides for this and when enforced will mean thousands of dollars per year to motoring organizations as well as great pleasure to the automobiling public.

* * *

BACKWARD, TURN BACKWARD

QUITE a few car owners would to-day like to go backward to the conditions of five or six years ago, rather than exert themselves enough to keep pace with the march of progress in the automobile field. There are scores of car owners who would like to have the old single-cylinder motors instead of the four or the six; there are others who would gladly cast the magneto aside, supplanting it with the dry cells; others ask for the planetary gearset instead of the selective, and many requests of similar tone are heard nearly every week.

These expressions come from a general atmosphere of uncertainty. It pervades so many sections of the industry. It is due to the evolutionary period through which we are passing. We have not reached the goal in any particular department of the motor car. The pneumatic tire is a marvel, but there are scores who are looking forward to the invention and manufacture of some Utopian spring wheel or cushion tire that will give satisfactory results at much lower cost. Hundreds are convinced that the ideal in carburetion is yet far off; and, in fact, carbureter makers are experimenting with the venturi, the multiple nozzle, waterjacketing and a score of other things. Nobody is certain to-day whether the poppet valve is going to remain in the ascendency for five years or if the slide-valve motor will usurp its position, or if some form of rotary valve will win out. In the contest department the experts are puzzled whether stock car events or free-for-all races will be the leader in a couple of years. Some makers are wondering whether it is better to go into races, reliability runs or other forms of tests. No wonder buyers wish for Father Time to turn back the hands. All this unrest is characteristic of the age; it pervades many other industries to-day, it is indicative of progress. Were we all contented, were everything to our liking, we would be miserable; in fact, we would be through with our usefulness in this world.

Detroit to Hold Season's First Show

Big Exhibition at Michigan State Fair

Full 1912 lines of automobiles, both commercial and pleasure, have been entered for space at the annual exposition, which will be held this year from Sept. 18 to 22. Manufacturing situation is far more favorable this Summer than it was last year and some of the companies are still under high pressure. Poss Company occupies deserted Anhut factory and intends to put out 1200 cars for 1912. The Detroit Automobile Dealers' Association will exhibit during the week of January 22.

DETROIT, Aug. 21—Detroit motordom is looking forward with great interest to what is likely to be the first comprehensive display of 1912 motor cars to be held anywhere in the United States. Reference is, of course, made to the annual show which takes place in the building particularly constructed for the purpose, on the grounds of the Michigan State Fair. Of course, the dates are coincident with those of the fair, September 18-22.

Every foot of space in "Motor Hall" has been taken and the larger number of the Detroit factories will exhibit, either directly or through their Michigan distributors. In addition, most of the manufacturers of motor cars whose factories are in Michigan, though outside Detroit, will be on hand.

Among the exhibitors will be representatives of the Jackson, Cole, Studebaker Corporation, Rapid, Brush, Poss, Hupmobile, Detroit Motor Wagon Co., Chalmers, Commerce Motor Car Co., Elmore, Hudson, Day Utility, Lion, General Motors, Abbott-Detroit, Cartercar, Regal, Oakland, Everitt, Cadillac, Buick, Overland, Detroit Electric, United Motors, Seitz, Mitchell-Lewis and many others. In each case the exhibitors promise to make displays of the complete lines for the coming year. In many cases the cars will be shown for the first time.

The fair's automobile show has come to be one of its most attractive features. In addition to the motor-wise who come to get their first view at the new designs, there is a large attendance of prospective purchasers who come to make their choice at a place where they have free access to the latest types.

The show has a separate management which, though under the general control of the Fair association, acts independently in conducting the display. Walter Wilmot is the show manager.

Following the sale of his Hupmobile stock by R. C. Hupp, the Hupp Motor Co. has issued the following announcement:

Charles D. Hastings has been appointed general manager of the Hupp Motor Car Co., to succeed R. C. Hupp, who has resigned, to devote his entire attention to other interests. Mr. Hastings has been with the Hupp Motor Car Co. as assistant general manager since its inception and has always been prominently identified in the executive affairs of this company, so that the retirement of Mr. Hupp will in no way affect the plans or policy of the Hupp Motor Car Co.

Mr. Hastings has been identified with the automobile industry since its infancy, having been connected with the Olds Motor Car Co. before the Hupmobile came into the market.

E. A. Nelson, the designer and chief engineer of the Hupp Motor Car Co., to whom is due the credit of the design and motor of the Hupmobile, is at the head of the engineering department of the factory, and the personnel of the officials of the company remains unchanged with the exception of Mr. Hupp's retirement.

The Hupp Motor Car Co. is interested only in the manufacture of the Hupmobile and has no other connection.

Production of 1912 models is in progress at all plants in Detroit at present and, while the rush of getting out demonstrators for the dealers is now over and there is very little night work, general activity is in progress to a much more noticeable extent than a year ago. The Packard is steadily increasing its force and is working at a rate in excess of anything in its history. The firm will shortly come into the possession of additional floor space which will raise its producing area to 37 acres. At present the plant employs 7,000 men and is the largest purchaser of labor in the local field. The firm is now about two weeks behind orders and is working its machine shop at night.

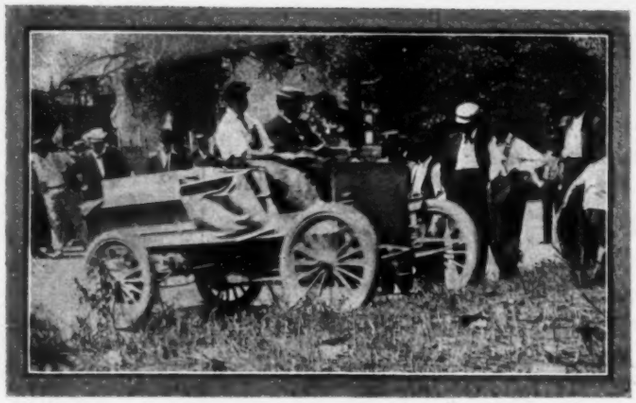
The deserted plant where the Anhut Six was formerly made has been occupied during the past week by the Poss Motor Co., the first car of which participated in the recent *Evening American* run between Detroit and Chicago. It is announced that the concern will produce 1,200 light delivery trucks during the coming year, with a load capacity of from 1,200 to 1,500 pounds.

The Poss is one of the few new concerns to enter the lists this season and, like nearly all of its generation, is a producer of commercial, rather than pleasure, vehicles. A number of new manufacturing concerns have been recently formed to produce parts and equipment, however. Among these are the Auto Lock & Specialty Co., of Detroit, capitalized at $15,000; the Durable Top Specialty Co., of Detroit, $15,000; and the Mason Motor Co., of Flint, $100,000.

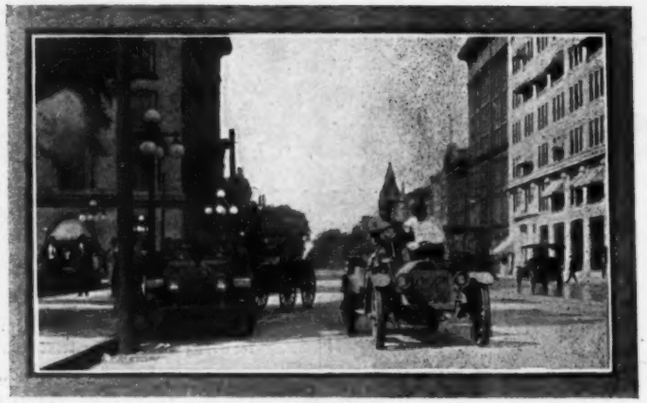
The week of January 22 has been selected as the date for the annual show of the Detroit Automobile Dealers' Association. Though no formal announcement has been made, it is probable that the show will again be held in the inadequate Wayne Gardens. This condition last year led to a secession of representatives of forty-five manufacturers who held a separate and competing show at the factory of the Regal Co. In all probability, those crowded out of the Gardens will take some similar action this year, as their show was a great success.

S. A. E. Adopts Standard Tires

Realizing the advantages to be gained by bringing about a condition of interchangeability between different makes of solid tires the Society of Automobile Engineers has, after considerable investigation, adopted a table of standard tire and wheel dimensions. It was universally acknowledged that it was of mutual advantage to all parties concerned that such a condition of standardization should obtain, but there was considerable work involved in order to determine what the various dimensions should be. The report was finally made, however, last Spring, and the plans of the motor vehicle manufacturers are to put the standards into effect by the beginning of the next calendar year.



Lincoln, No. 24, winner Class 2K, undergoing brake test



Le Moon, No. 23, winner in Class 4K, checked in first at South Bend

Chicago Truck Run Finished

Six Perfect on Road with Buick as Winner

Of the twenty-six starters in the truck run under the auspices of the Chicago "American," which lasted nine days and was laid out through rough going for two days, twenty-four checked in on time. The cars covered Indiana, Ohio and Michigan and ran on a schedulee of from eight to fourteen miles an hour. Despite adverse road conditions the column made a fine showing.

CHICAGO, Aug. 21—On August 17, the nine-day reliability run for commercial vehicles, promoted by the Chicago *Evening American,* ended at the starting point, in Chicago. The route was from Chicago to Detroit, with night stops at South Bend, Fort Wayne, Lima and Toledo; and back by way of Jackson, Kalamazoo and South Bend. The distance covered was 756 miles, with the vehicles runing at an average schedule speed of from 8 to 14 miles per hour.

Of the twenty-six vehicles that started in the run, twenty-five finished and twenty-four checked in on time, only one having fallen out on the fourth day as a result of engine trouble. Six out of the twenty-five to finish had perfect scores at the end of the run; but only one of these managed to survive the final technical examinations.

A two-cylinder Buick delivery wagon, with a load of 1500 pounds and driven by F. W. Kunze, was the only perfect score

Group of drivers who participated in the Chicago American's truck run—taken at Jackson, Mich.

FINAL RESULTS CHICAGO EVENING AMERICAN SECOND COMMERCIAL VEHICLE RELIABILITY RUN

No.	Car.	Driver.	Class.	Gallons Gasoline	Pints Oil.	Cost Gasoline.	Cost Oil.	Cost Driver.	Car Depreciation.	Total Cost.	Total Cost per Mile Less Tire.	Depreciation Tires.	Total Cost Mile.	Capacity, Tons.	Cost per Ton Mile.	Total Road Penalties.	Technical Examination Penalties.	Total Penalties.	Total Cost per Ton Mile, Including Penalties at 1 of a Cent per Penalty.	
9	Poss	W. F. Trudeau		With	drawn															
24	Lincoln	Chas. Woodrich	2K	41.	18.25	$4.92	$.57	$22.50	$1.76	$29.75	$.039	.03	.069	.5	.138	4	1	5	$.143	Winner
37	Van Dyke	H. J. Morrison		66.5	108.5	7.98	3.38	22.50	3.24	37.10	.049	.03	.079	.5	.158	188	7	195	.353	
5	Modern	C. Bigelow		74.5	13.	8.94	.47	22.50	5.22	37.13	.049	.02	.069	.75	.104	26	15	41	.145	Winner
10	Buick	P. W. Kunze		44.62	58.5	5.35	1.83	22.50	3.00	32.68	.043	.035	.078	.75	.117	Perf.	Perf.	Perf.	.117	
11	Buick	A. Easterday	3K	52.63	47.5	6.32	1.48	22.50	3.00	33.30	.044	.035	.079	.75	.119	Perf.	15	15	.134	
27	Krickworth	J. M. Worth		57.	38.	6.84	1.19	22.50	4.32	34.85	.046	.02	.066	.75	.099	25	Perf.	25	.124	
31	Chi. Pneu. Tool	E. W. Aplin		77.75	96.5	9.33	3.02	22.50	3.15	38.00	.050	.02	.070	.75	.105	51	86	137	.242	
33	Chase	H. L. Ferris		59.38	24.	7.13	.75	22.50	2.88	33.26	.0439	.02	.064	.75	.096	10	76	86	.182	
1	Gramm	A. L. Nobbs		97.88	33.	11.75	1.06	22.50	6.75	42.06	.0556	.02	.076	1.0	.0756	1492	26	1518	1.594	
6	Hewitt	J. W. Gardham		63.63	51.5	7.64	1.62	22.50	4.68	36.44	.048	.02	.068	1.0	.068	Perf.	26	26	.094	
20	Louth-Juergens	F. W. Herrick		71.	25.8	8.52	.80	22.50	6.39	38.21	.051	.02	.071	1.0	.071	69	27	96	.167	
23	Nelson LeMoon	A. R. LeMoon	4K	52.	35.	6.24	1.09	22.50	7.20	37.03	.0489	.02	.069	1.0	.0689	Perf.	3	3	.072	Winner
30	Owosso	Wm. Rust		88.	17.7	10.50	.56	22.50	6.22	39.78	.0525	.02	.073	1.0	.0725	96	7	103	.176	
34	Chase	J. O'Brien		69.75	48.	8.37	1.50	22.50	4.59	36.96	.0488	.02	.069	1.0	.0688	8	25	33	.102	
38	Clark	McCue		90.38	17.5	10.85	.55	22.50	6.66	40.56	.053	.02	.073	1.0	.073	68	12	80	.153	
39	Ideal	W. C. Mills		77.63	198.5	9.32	6.22	22.50	4.23	42.27	.0559	.02	.076	1.0	.0759	7	50	57	.133	
32	Federal	R. F. Moore	5K	96.88	16.	11.63	.50	29.97	5.47	47.57	.062	.03	.092	1.25	.0736	Perf.	9	9	.083	Winner
36	Stephenson	E. H. Zimmer		108.38	17.5	13.01	.55	29.97	6.20	49.73	.065	.03	.095	1.25	.076	2040	10	2050	2.126	
2	Gramm	A. Withrow	6K	117.75	27.5	14.13	.86	29.97	8.38	53.34	.0706	.03	.111	2.0	.055	7	2	9	.064	Winner
13	Mais	A. F. Mais		115.25	17.	13.83	.53	29.97	10.80	55.13	.0728	.04	.113	2.5	.0451	Perf.	5	5	.050	
16	Kelly	A. E. Rayner	7K	121.38	36.	14.57	1.13	29.97	9.04	54.71	.0723	.04	.112	2.5	.0449	4	Perf.	4	.049	Winner
3	Gramm	C. A. Haines		160.15	39.	19.22	1.22	37.53	11.40	69.37	.091	.04	.131	3.0	.0437	1351	4	1355	1.399	
14	Dayton	A. H. Bennett	8K	129.	92.5	15.48	2.36	37.53	10.84	66.21	.087	.04	.127	3.0	.0423	19	27	46	.088	
17	Kelly	C. R. Withgott		126.25	45.5	15.15	1.41	37.53	10.08	64.17	.084	.04	.124	3.5	.0354	3	10	13	.048	Winner
4	Gramm	A. E. Walden	9K	188.25	62.	22.59	1.98	37.53	14.82	76.88	.1017	.06	.162	5.0	.0323	64	18	82	.114	Winner

car at the end of the final technical examinations. The six cars, however, that managed to finish with perfect road scores included two Buicks, Hewitt, Nelson-LeMoon, Federal and Mais.

All of the above cars, however, are not winners. In deciding the winner of the tour the cost of operation per ton-mile has been the chief determining factor, while the road penalties and those of the final technical examination have been a minor consideration; it will be found, however, in some instances that the latter assumed the greater proportions in the final score.

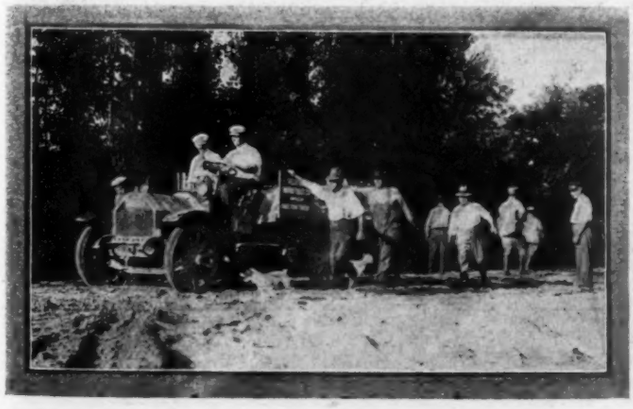
As shown in an accompanying table, the cup winners in the respective classes are as follows: Class 2K, No. 24 Lincoln; Class 3K, No. 10 Buick; Class 4K, No. 23, Nelson-LeMoon; Class 5K, No. 32 Federal; Class 6K, No. 2 Gramm; Class 7K, No. 13 Mais; Class 8K, No. 17 Kelly; and Class 9K, No. 4 Gramm.

In promoting this contest, it has been the object of the Chicago *Evening American* not only to emphasize the superiority of the motor over the horse-drawn vehicle, but also to demonstrate to the purchaser of commercial vehicles the cost of their operation. An accurate record of all the gasoline and oil used by each vehicle throughout the run has been kept by the technical committee, as well as an account of all repairs and adjustments made; and these factors, together with a certain stipulated sum or percentage for tire cost per mile, up-keep cost, and chassis depreciation per annum, have been used to determine the winner of the contest.

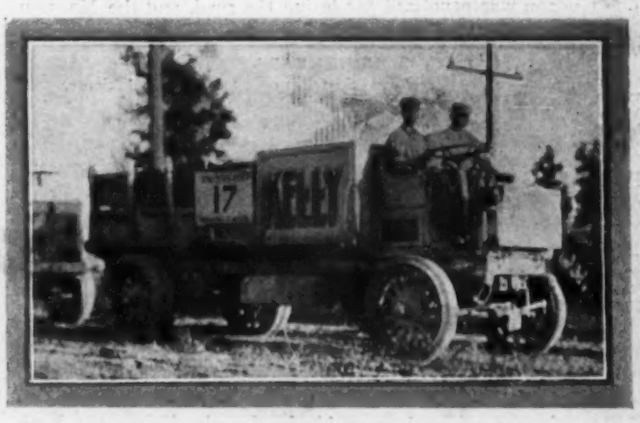
In the data collected during this demonstration there is much, perhaps, that is not to be taken too seriously, because the constants or percentages used to decide the winners are of an arbitrary nature. As yet there is no data on which an absolutely fair percentage of chassis depreciation and tire cost can be based; nor can the reliability of a commercial vehicle be fairly demonstrated in a run of but 756, 1000, or even 2000 miles. Depreciation hardly begins until a vehicle has been run 2000 miles, and then it is not in direct proportion to the mileage, but in an ever-increasing ratio. This ratio, too, is affected to a very great extent by the character of the tires employed.

In this demonstration each of the vehicles was loaded to its catalogued capacity. In all 36 1-2 tons were transported 756 miles on 2247 gallons of gasoline and 148 gallons of lubricating oil.

One error was made in the laying out of the route that greatly affects the final results. For two days the cars were driven through a territory where the roads were in terrible shape, and the conditions were anything but those for which the commercial car is designed. No one would ever consider the use of a commercial car in a country where the roads were impassable, and during these two days all of the larger vehicles in the run were subjected to strains that never would be encountered in any regular service in which a motor vehicle would be practicable. Had it not been for the severe conditions encountered during these two days, a much better fuel and oil economy would have been shown by the heavier vehicles.



Federal, No. 32, winner in Class 5K, climbing Gulch Hill, near Battle Creek



Kelly, No. 17, driven by Withgott, which won in Class 8K, performed well throughout the run

Many gallons of fuel and oil were consumed by those vehicles during the hours that their engines were being strained and raced while pulling each other out of the deep sandy places that allowed the axles to rest on the roadbed.

As for the weaknesses in design and construction that the run brought out in the various contesting vehicles, there were but few, and these for the most part of small importance. The test, however, was a severe one, and those vehicles that did have weak points had them very plainly shown up. It was an excellent means of showing the maker where the weak points lay.

Another important feature was the excessive wear on some of the tire equipment, some of the vehicles having to make several changes, while others of the same weight made no changes and still managed to keep their tires in good shape. The following facts were brought out: Where a car is to be used on country roads where there are ruts to contend with, the tread of the wheels should be standard and the wheels shod with single and not dual tires.

In cases where the tread was wider than standard, it was necessary to drive with the wheels on one side of the car in a rut, while the other wheel would be breaking down the crest on the outside of the other rut, thereby causing excessive power consumption and excessive wear on the one tire and perhaps on both. If dual tires are fitted, and the tread is standard, then both outside tires generally are breaking down the crest of the ruts on either side, and rapid wearing away of the rubber takes place.

Dorris Wins Missouri Run

ST. LOUIS, Aug. 21—A Dorris car, driven by J. E. Baker, won first place in the touring car class in the four-day reliability run from St. Louis to Kansas City and return, which began Aug. 14 and finished Aug. 17, under the auspices of the St. Louis Automobile Manufacturers' and Dealers' Association. Incidentally the Dorris also carried off the special cup offered by the St. Louis Motor Accessories Association for the car, regardless of class, to finish with the highest score.

A protest was filed against the Ford, which was awarded first honors in the runabout class, on the ground that it did not carry stock equipment. The protest was sustained, and the final award made to the Flanders, which had been penalized two points.

The route followed going to Kansas City was what is known as the Northern Highway, and the return trip was made by way of the Central route, which has just been adopted as the official State Highway. The Inter-State was penalized 50 points for being late at a control, having lost the route. The Parry was penalized for a motor stop due to water getting into the carbureter at a deep ford. The Cadillac was disqualified because the driver misunderstood the rules and worked on his car at noon stop. The Ohio withdrew because of a series of small mishaps, after making a perfect road score for two days. The Hudson was penalized for losing the road, and the Marmon drove 50 miles out of its way and was penalized. Summary:

TOURING CARS.

Car.	Road Score.	Technical Score.
Dorris	Perfect	Perfect
Marmon	3	Perfect
Mitchell	9	Perfect
Parry	7	5
Interstate	56	8
Hudson	12	53
Buick	53	36
Ohio	Withdrawn	
Cadillac	Disqualified	

ROADSTERS.

Ford No. 6	Perfect	Protested
Flanders No. 12	Perfect	2
Ford No. 5	35	Perfect
Flanders No. 11	96	2

Blanks Out for Fairmount Park Race

PHILADELPHIA, Aug. 21—The Quaker City Motor Club on Friday afternoon issued entry blanks for the Fairmount Park 200-mile road race to be held over the 8-mile West Park course at noon on Saturday, October 7.

The placing of the management of this annual classic in the hands of the Quaker City Motor Club ends a contest that has been waging off and on for a period of several months between the Quaker City Motor Club, Mayor Reyburn and the Philadelphia Automobile Trades Association, the latter organization, composed of dealers in gasoline pleasure cars, having some time ago put in a bid for the honor of conducting it.

As in last year's race, cars will be classified in four divisions, 3-C, 231 to 300 cubic inches piston displacement; 4-C, 301 to 450; 5-C, 451 to 600; 6-C, 601 to 750; cars in each of the divisions to compete for division prizes of $1,000, with a grand prize of $2,500 for the car making the best time.

The entry list is limited to 30 cars.

Jerseymen Moving for Reciprocity

SPRING LAKE, N. J., Aug. 21—That the residents of this State are feeling the effects of the restrictive legislation that is keeping the motorists of adjacent commonwealths away was demonstrated at a meeting held here last Saturday, and which was called at the instance of T. Frank Appleby, of the Ocean Boulevard Commission. Many prominent men from all parts of the State were present, and although several items were mentioned in the call for the meeting, it was manifest that the subject nearest the hearts of all was that which had to do with the passage of a law that will insure reciprocal treatment to the auto-

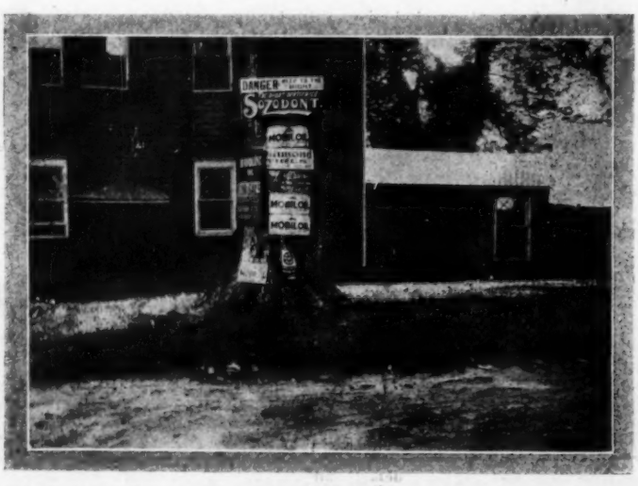
To Tear Down Signs

Ugly and puzzling defacements of warning and distance marks on the highways of New York may be destroyed by anyone after Sept. 1 and signs displayed upon highways that are not specifically permitted by the owners of private property may also fall under the axe of anyone who pleases to destroy them. The A. C. A. proposes to make September 1 the day for such destruction.

"CLEAN-UP DAY" is being strongly advocated by the Good Roads Committee of the Automobile Club of America, meaning that on September 1 when the new law prohibiting the defacement of sign posts, milestones and danger signals to automobilists goes into effect that owners of automobiles shall make it a point to destroy all such defacements.

The accompanying illustrations show how the meaning of a warning to automobilists may be fogged with extraneous matter and the law prescribes that unauthorized signs may be destroyed by anyone.

The section of the law relied upon by the club as its author-



This is the kind of thing that automobilists are asked to put an end to on and after Sept. 1

mobilists of other States granting similar privileges to motorists of this State.

After a long debate a resolution introduced by J. H. Wood, president of the Associated Automobile Clubs of New Jersey, was finally adopted calling upon the Legislature to pass a reciprocity law at its next session, at the same time providing against any possible reduction of the revenue by urging that the law be so framed as "to show an increase" in receipts.

At the opening of the meeting Mr. Appleby, who is Mayor of Asbury Park, admitted that the motorists were a big factor at all the shore resorts, and that everything possible should be done to attract them. Other speakers who advocated remedial legislation were H. A. Bonnell, general manager of the Automobile Board of Trade; Frederick W. Kelsey and J. C. Anthony. The resolutions as finally adopted read as follows:

"Resolved, That a law be enacted with regard to the use of automobiles within the State which will grant the same rights and privileges to the owners and drivers of machines from other States that are accorded the citizens of New Jersey, in the States from which said owners and drivers hold their licenses; and be it further,

"Resolved, That it is the sense of this meeting that the system of licensing automobile in New Jersey be adjusted so as to show an increase of revenue."

The meeting also passed a resolution favoring the enactment at the next session of the Legislature of a law which shall place the maintenance of "through roads under the direct supervision of the State Road Department." At present the various counties and towns are taking care of their respective roads with indifferent success.

A representative delegation of prominent automobilists waited upon Governor Woodrow Wilson, of New Jersey, on Tuesday, seeking his aid to alleviate the peculiar legal situation in Jersey. The party was headed by H. A. Bonnell, general manager of the Automobile Board of Trade, and included J. R. Wood, president of the Associated Clubs; George Blakeslee, Senator Edge and several other leaders in the fight.

The main point discussed was the abrogation of the nauseous Power of Attorney clause and in emphasizing this phase of the matter, Mr. Bonnell on behalf of the delegation submitted to the Governor a copy of last week's issue of THE AUTOMOBILE containing an extended article on the Jersey Chinese Wall which paid particular attention to the objectionable clause.

Governor Wilson accepted the article and assured the committee that he would give it due attention.

ity for undertaking the campaign was passed by the recent legislature and is as follows:

"A person who willfully or maliciously displaces, removes, injures or destroys a mile-board, mile-stone, danger sign or signal, or guide sign or post, or any inscription thereon, lawfully within a public highway; or who, in any manner paints, puts or affixes any business or commercial advertisement on or to any stone, tree, fence, stump, pole, building or other structure, which is the property of another, without first obtaining the written consent of such owner thereof, or who in any manner paints, puts or affixes such an advertisement on or to any stone, tree, fence, stump, pole, mile-board, mile-stone, danger-sign, danger-signal, guide-sign guide-post, billboard, building or other structure within the limits of a public highway *is guilty of a misdemeanor.* Any advertisement in or upon a public highway in violation of the provisions of this subdivision may be taken down, removed or destroyed by any one.*

"This act shall take effect September 1, 1911."

*A misdemeanor is punishable by a fine up to $500 or one year in jail, or both, at the discretion of the Court.

Another instance of the defacement of roadside trees due to pernicious advertising methods

Jersey Farmer Helps

This being a true incident of an actual experience suffered by an interstate tourist who met with delay and tire trouble and ran short of gasoline. The following story tells just how the Jerseyman rose to the occasion and combined the joys of a kindly act well performed with the chance to make a little hay while the sun did not shine.

WILMINGTON, DEL., Aug. 21—An interesting story is being told here—and it is true, too—which has got what is commonly known as "Jersey extortion" beat a mile, and it may be a coincidence that it all happened in Jersey.

A few weeks ago George A. Elliott, a prominent local attorney and churchman, went to New York to sail for Europe, with his family, leaving Wilmington the day before he was to sail. After reaching New York he decided to take his touring car abroad and accordingly telephoned to his chauffeur, who was at his house, here, to bring the car to New York and to deliver it by 10 o'clock that night at the Waldorf-Astoria, where the Elliotts were temporarily stopping.

All went well until Trenton was reached, when he had a blow-out. This caused a delay, but was not nearly as serious as the next mishap, when both tubes of one of the tires exploded, after the machine had proceeded a short distance above Trenton.

Nightfall was coming on and just as the machine entered a heavily wooded road the car stopped short and an examination showed that the gasoline was exhausted.

After waiting until about 11 o'clock, and with no hope of any other solution of the problem, the chauffeur set out on foot for the next town, about 2 miles distant, but he was unable to get any gasoline. He was informed, however, that 3 miles further on there was a farmer who had a gasoline engine, and that he might be willing to sell a sufficient quantity.

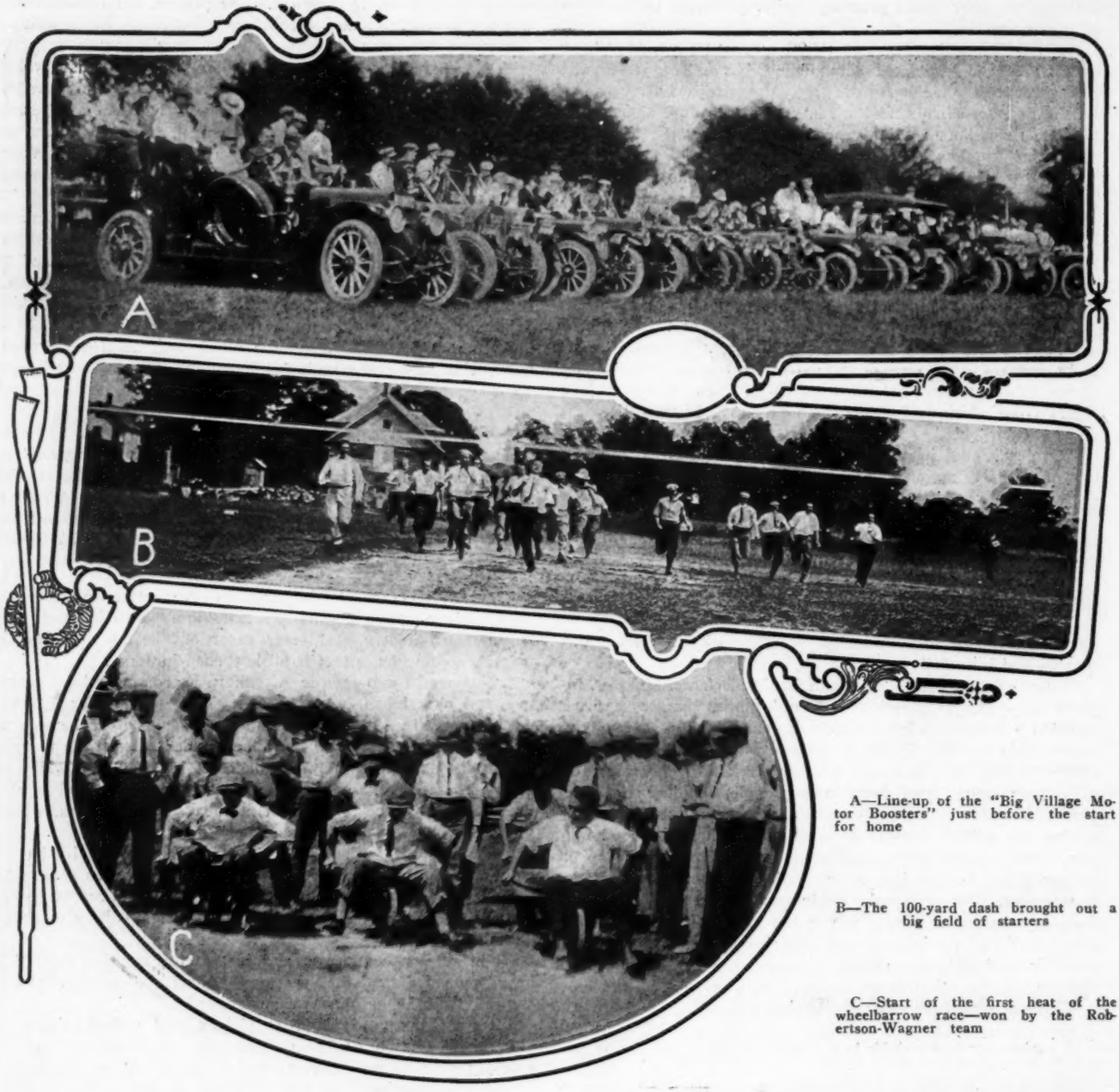
There was nothing else to do and the chauffeur "hoofed it" to the abode of the aforesaid farmer, whom he finally succeeded in arousing from his slumbers. After the situation was made clear to the sleepy farmer, the latter agreed to let the chauffeur have three gallons of gasoline, and with the gasoline and chauffeur he started in his wagon in the direction of the belated machine, which was reached in due time.

Before the farmer would permit the gasoline to be taken out of his wagon he demanded settlement. There were three gallons and he was asked what he was going to charge for them. "Nine dollars a gallon," was his reply.

"Why you are joking," said the chauffeur.

"No, I'm not," the farmer replied. "You will have to pay me $27 before that gasoline leaves my wagon. You don't suppose I'm going to get out of my bed and haul oil five miles for nothing. My price is $9 a gallon, and nothing less."

It cost Mr. Elliott just $185 to get his car driven over from Wilmington to New York.



A—Line-up of the "Big Village Motor Boosters" just before the start for home

B—The 100-yard dash brought out a big field of starters

C—Start of the first heat of the wheelbarrow race—won by the Robertson-Wagner team

Motor Boosters' Picnic

Over 100 men connected wth the New York automobile industry in one way or another attended the first annual outing of the organization known as the Big Village Motor Boosters. The affair was held at Smithtown, L. I., and a long semi-athletic program was decided and everybody had a splendid time. The baseball game was a feature of the outing.

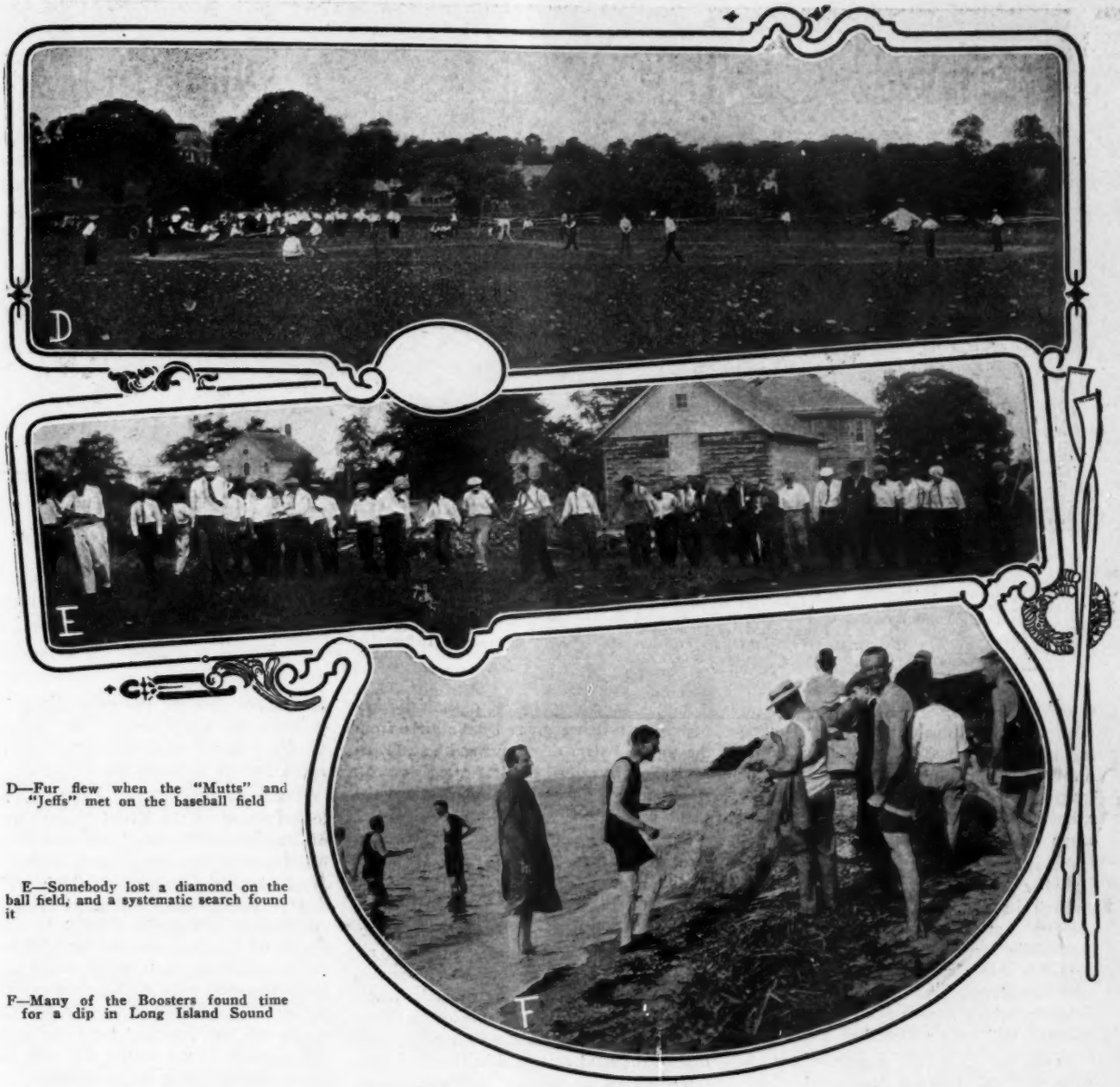
SOMETHING over 100 members of New York City's automobile industry answered the call issued by the Big Village Motor Boosters for its first annual outing Wednesday, August 16, at Smithtown, L. I. The bulk of the boosters made the 49-mile run by automobile, reaching Riverside in time for breakfast. The first number on the program after breakfast had been allowed to settle was a baseball game in which everybody but the cripples took part. It is recorded that there were four shortstops on each side. The final score after five innings was 83 to 47, Captain George Robertson's team being on the long end. Horace A. Bonnell, General Manager of the Automobile Board of Trade, acted as umpire of play and escaped practically unscathed.

James E. Sullivan, recently named as a member of the new boxing commission, was to have acted as referee; but owing to the injuries he sustained in a train wreck a few days ago, he was excused and Mr. Bonnell subbed on the job.

The 100-yard dash developed some fast announced time, the time being much faster than anything in the race, as it was discovered afterward that the course was twenty yards short. There was a long program decided embracing every known form of contest and a few that were specially invented for the occasion. The automobile obstacle race, during which the cars were required to make a serpentine course around a series of barrels, was won by a Corbin (W. E. Carney) defeating the bigger and heavier cars around the sharp turns.

There were swimming races and just plain bathing and lots of other amusement for the members.

The whole affair was most enjoyable and throughout there was not an unpleasant incident. The spirit of good fellowship pervaded. At dinner, which wound up the day of pleasure, over



D—Fur flew when the "Mutts" and "Jeffs" met on the baseball field

E—Somebody lost a diamond on the ball field, and a systematic search found it

F—Many of the Boosters found time for a dip in Long Island Sound

100 sat down together. Mrs. Fred J. Wagner provided lunches for the picknickers during the day.

The boosters plan some other variety of function during the Fall and a smoker shortly after the conclusion of the metropolitan show season.

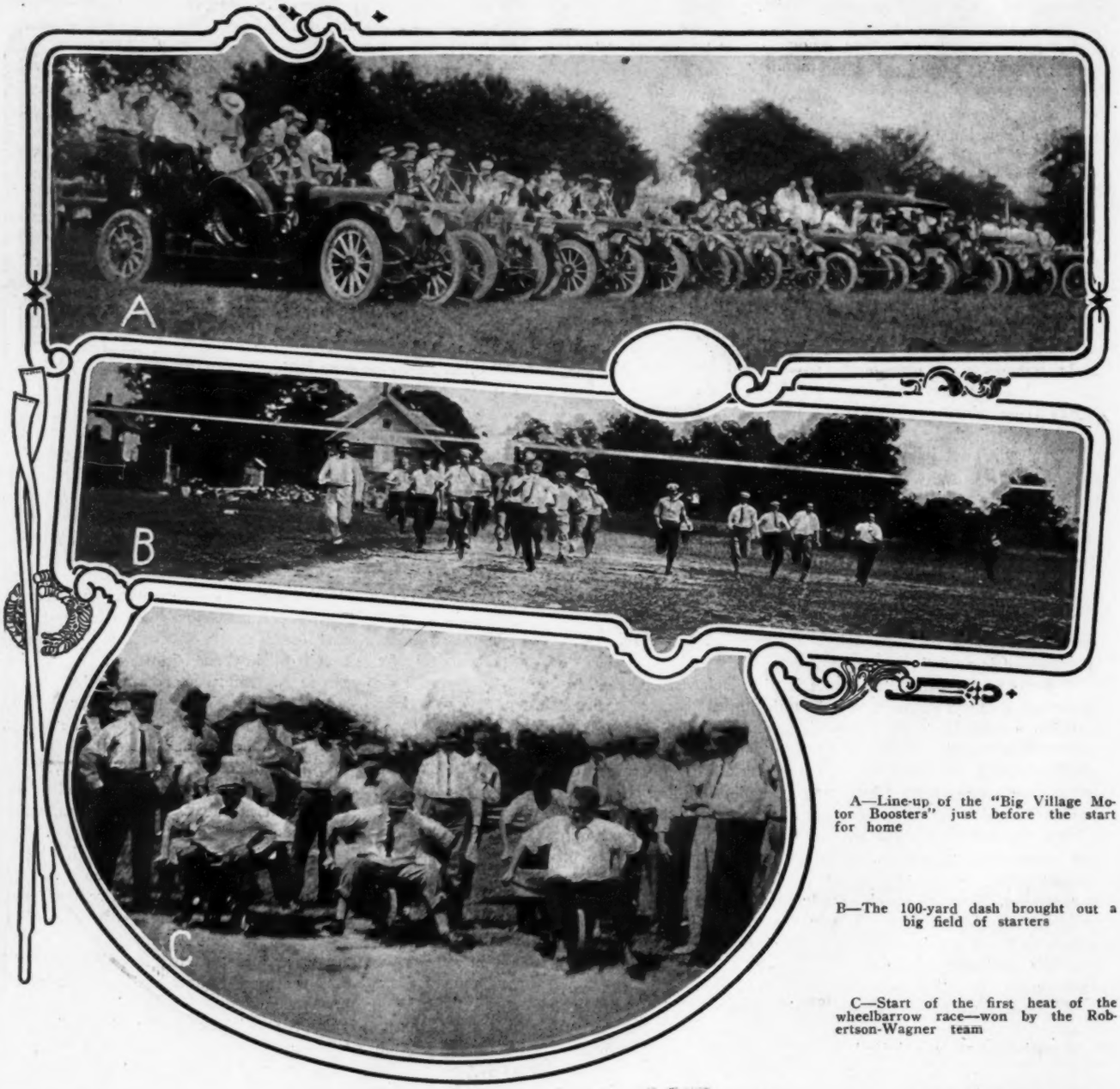
Score Enter Glidden Tour

Despite the fact that entry blanks for the Glidden Tour of 1911 have been issued only about a week, a score of entries have already been received and more are being received every day. The start of the tour is scheduled to take place at New York, October 15, and the finish will be at Jacksonville, Fla., October 25. The course over which the automobiles will travel will be via Atlanta.

The final clause in the entry blank is causing much interest and not a little comment. It reads as follows: "Inasmuch as the National Tour is a good roads and tourists' tour, without technical examination or technical penalties, it is open to any owner of a bona-fide touring car or runabout and the Stock Registration Requirement of the rules is hereby waived."

The contestants will run in teams of three, not necessarily of the same make or year, and the award will be made to the city represented by the team accumulating the least number of demerits.

So far the entry list comprises the following: 1912 Flanders, C. E. Winn, Atlanta; 1912 White, J. S. Cohen, Atlanta; 1910 Chalmers, J. H. Marsteller, Roanoke, Va.; Oldsmobile, Dr. W. N. Stinson, Jacksonville, Fla.; Cadillac, Claude N. Nolan, Jacksonville, Fla.; Garford, R. P. Hooper, Philadelphia; 1912 Maxwell, U. S. Motor Co., New York; 1912 Maxwell, U. S. Motor Co., New York; 1912 Maxwell, U. S. Motor Co., New York; 1911 Pierce-Arrow, E. P. Ansley, Atlanta; 1912 Stevens-Duryea, C. H. Johnson, Atlanta; 1911 Marmon, H. M. Grant, Atlanta; 1912 White, J. S. Cohen, Atlanta; 1911 Cole, H. B. Race, Jacksonville; 1911 Cadillac, O. S. Albritton, Jacksonville; 1912 Cadillac, W. J. Hillman, Live Oak, Fla.; 1912 Cunningham, A. H. Whiting, New York; 1912 Reo, Ray M. Owen, New York; 1912 Reo, Ray M. Owen, New York; 1910 Knox, W. C. Aycock, Moultrie, Ga.



A—Line-up of the "Big Village Motor Boosters" just before the start for home

B—The 100-yard dash brought out a big field of starters

C—Start of the first heat of the wheelbarrow race—won by the Robertson-Wagner team

Motor Boosters' Picnic

Over 100 men connected wth the New York automobile industry in one way or another attended the first annual outing of the organization known as the Big Village Motor Boosters. The affair was held at Smithtown, L. I., and a long semi-athletic program was decided and everybody had a splendid time. The baseball game was a feature of the outing.

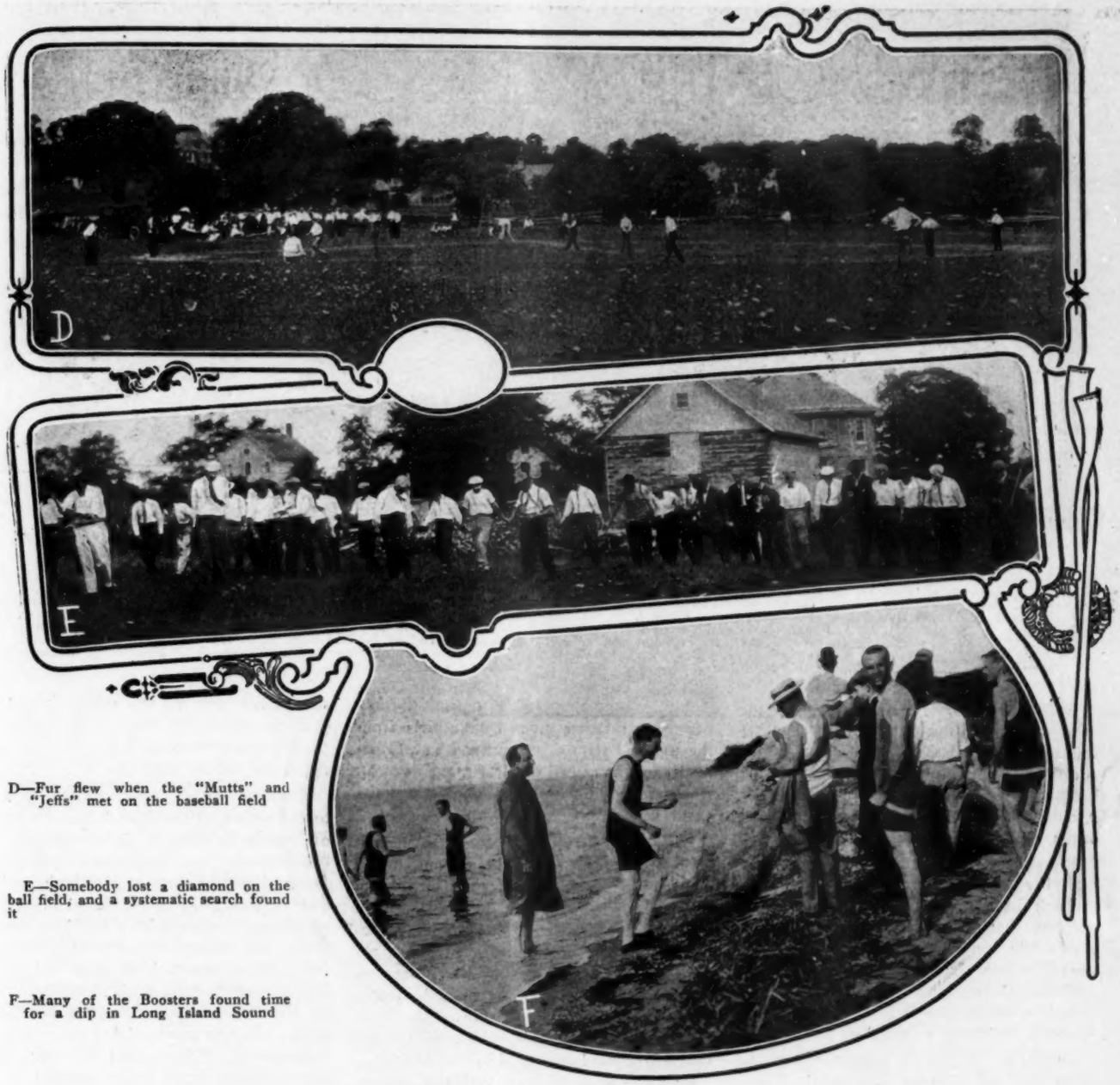
SOMETHING over 100 members of New York City's automobile industry answered the call issued by the Big Village Motor Boosters for its first annual outing Wednesday, August 16, at Smithtown, L. I. The bulk of the boosters made the 49-mile run by automobile, reaching Riverside in time for breakfast. The first number on the program after breakfast had been allowed to settle was a baseball game in which everybody but the cripples took part. It is recorded that there were four shortstops on each side. The final score after five innings was 83 to 47, Captain George Robertson's team being on the long end. Horace A. Bonnell, General Manager of the Automobile Board of Trade, acted as umpire of play and escaped practically unscathed.

James E. Sullivan, recently named as a member of the new boxing commission, was to have acted as referee; but owing to the injuries he sustained in a train wreck a few days ago, he was excused and Mr. Bonnell subbed on the job.

The 100-yard dash developed some fast announced time, the time being much faster than anything in the race, as it was discovered afterward that the course was twenty yards short. There was a long program decided embracing every known form of contest and a few that were specially invented for the occasion. The automobile obstacle race, during which the cars were required to make a serpentine course around a series of barrels, was won by a Corbin (W. E. Carney) defeating the bigger and heavier cars around the sharp turns.

There were swimming races and just plain bathing and lots of other amusement for the members.

The whole affair was most enjoyable and throughout there was not an unpleasant incident. The spirit of good fellowship pervaded. At dinner, which wound up the day of pleasure, over



D—Fur flew when the "Mutts" and "Jeffs" met on the baseball field

E—Somebody lost a diamond on the ball field, and a systematic search found it

F—Many of the Boosters found time for a dip in Long Island Sound

100 sat down together. Mrs. Fred J. Wagner provided lunches for the picknickers during the day.

The boosters plan some other variety of function during the Fall and a smoker shortly after the conclusion of the metropolitan show season.

Score Enter Glidden Tour

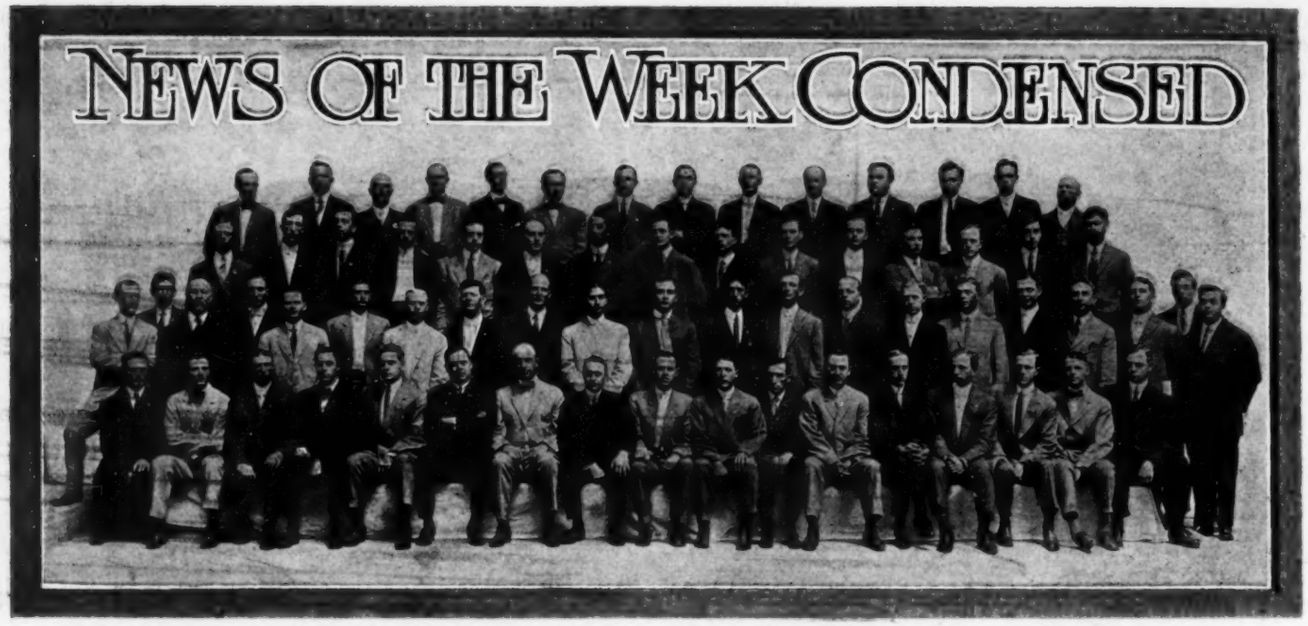
Despite the fact that entry blanks for the Glidden Tour of 1911 have been issued only about a week, a score of entries have already been received and more are being received every day. The start of the tour is scheduled to take place at New York, October 15, and the finish will be at Jacksonville, Fla., October 25. The course over which the automobiles will travel will be via Atlanta.

The final clause in the entry blank is causing much interest and not a little comment. It reads as follows: "Inasmuch as the National Tour is a good roads and tourists' tour, without technical examination or technical penalties, it is open to any owner of a bona-fide touring car or runabout and the Stock Registration Requirement of the rules is hereby waived."

The contestants will run in teams of three, not necessarily of the same make or year, and the award will be made to the city represented by the team accumulating the least number of demerits.

So far the entry list comprises the following: 1912 Flanders, C. E. Winn, Atlanta; 1912 White, J. S. Cohen, Atlanta; 1910 Chalmers, J. H. Marsteller, Roanoke, Va.; Oldsmobile, Dr. W. N. Stinson, Jacksonville, Fla.; Cadillac, Claude N. Nolan, Jacksonville, Fla.; Garford, R. P. Hooper, Philadelphia; 1912 Maxwell, U. S. Motor Co., New York; 1912 Maxwell, U. S. Motor Co., New York; 1912 Maxwell, U. S. Motor Co., New York; 1911 Pierce-Arrow, E. P. Ansley, Atlanta; 1912 Stevens-Duryea, C. H. Johnson, Atlanta; 1911 Marmon, H. M. Grant, Atlanta; 1912 White, J. S. Cohen, Atlanta; 1911 Cole, H. B. Race, Jacksonville; 1911 Cadillac, O. S. Albritton, Jacksonville; 1912 Cadillac, W. J. Hillman, Live Oak, Fla.; 1912 Cunningham, A. H. Whiting, New York; 1912 Reo, Ray M. Owen, New York; 1912 Reo, Ray M. Owen, New York; 1910 Knox, W. C. Aycock, Moultrie, Ga.

NEWS OF THE WEEK CONDENSED



RAMBLER SALESMEN GATHERED AT THE KENOSHA, WIS., FACTORY FOR THE ANNUAL CONVENTION

Top Row—G. M. Berry, M. Mattson, C. D. Hagerty, A. L. Stapleton, G. R. Sutherland, Al. Reeke, E. J. Wall, A. R. Rockwell, C. S. Culp, B. F. Spencer, O. Murphy, G. H. Cox, H. F. Lantz, G. Braithwaite. Second Row—W. F. Portwine, J. M. Gaffney, R. S. Bennett, C. Sklarek; C. A. Baker, J. K. Bond, F. E. Devlin, Gilbert Williams; F. C. Mock, J. O. McDonald, J. A. Rose, W. C. Burbank, E. S. Jordan, J. P. Zens, R. Jardine. Third Row—O. G. Formhals, E. G. Soward, H. H. Maddock, F. W. Rosche, T. D. Cobbs, Jr., G. B. Owens, H. E. Tanner, F. C. Bacon, W. S. Simonds, L. A. Poundstone, W. H. Knight, T. B. Long, I. J. Kinnett, L. E. Rood, R. C. Chase, C. D. Dunham, C. M. LeRoux, G. D. Racine, Z. C. Elkins, H. G. Musgrave, H. P. Thompson. Fourth Row—J. W. DeCou, M. E. Lebon, E. E. Herring, W. E. Wissler, G. C. Norwood, S. S. Jenkins, I. R. Campbell, C. T. Jeffery, E. J. Leach, W. G. Schultz, H. M. McEachren, P. J. Keating, C. O. Hart, G. A. Ruckert, P. D. Carman, L. P. Kilbourne, G. N. Bliss.

NEWARK, N. J.—Forty applications were acted upon at the August meeting of the trustees of the New Jersey Automobile and Motor Club last Tuesday, bringing the membership total close to the 2,500 mark. *The Club Bugle*, the official organ, made its first appearance last week.

PITTSBURGH—The newly organized Chamber of Commerce at Sharon, Pa., through its chairman, H. H. Cohen, announces that Sharon has secured a big automobile factory on which work will be started within sixty days. The plant may afford employment to 2,000 hands and the company, which is now being organized, it is stated, will have a capital of $250,000.

COLUMBUS, O.—The announcement is made that the Eastern Automobile Company, recently incorporated with a capital of $20,000, has taken over the garage and repair shop formerly operated by the L. & E. Garage & Sales Company at 60-62 East Spring street, Columbus, Ohio. J. Goldstein is president; J. E. Leacy, secretary and F. F. Cain, general manager.

PITTSBURGH—Edward M. Bigelow, of Pittsburgh, State Road Commissioner of Pennsylvania, recently appointed by Governor John K. Tener, announces that work will be started shortly on a 50-mile thoroughfare to extend from Gettysburg and by the historic battlefield to the Pennsylvania State line. He plans to have the road entirely finished by the time the grand reunion is held in Gettysburg.

TOLEDO, O.—The new club house of the Willys-Overland employees, located at Bay Shore, Toledo, is furnishing much diversion this summer. One of the latest functions was a dance given by the girls from the top and trim departments. The Overland band furnished music for the dancers. About forty young women employed at the plant attended.

DES MOINES—The Des Moines Automobile Association will hold an automobile show in connection with the Iowa State Fair, which is to be held in the last week in August at the State Fair Grounds. Practically all the dealers in the city have reserved space, and the affair will be second in importance only to the annual Winter Automobile Show. A feature of the show is to be a floral parade, which will be the first of the kind ever held in Des Moines.

RACINE, WIS.—George Williams, superintendent of the motor department of the J. I. Case Threshing Machine Co., Racine, Wis., whose resignation was announced a short time ago, will on Sept. 1 become factory manager of the King Motor Co. of Detroit, in which he holds an interest. On leaving Racine Mr. Williams was tendered a banquet by the foremen and employees and was made the recipient of many valuable gifts, including a watch suitably inscribed, a set of cuff links and a studded watch charm.

PITTSBURGH—The American Rubber & Fabric Company gave a demonstration of its puncture-proof tire on Grant street last week. A car equipped with its tires and heavily laden was run over a plank from which protruded 100 sharpened spikes extending out from one to two inches. Although the spikes penetrated the rubber shoe of the tire they did not puncture the fabric lining. The American Company has secured a location at Jeannette, Pa., on the main line of the P. R. R.

HARTFORD, WIS.—Work on the addition to the works of the Kissel Motor Car Co. of Hartford, Wis., has been started. The building will have dimensions of 107 x 200 feet and will be three stories high, with 12 and 14 foot ceilings, of solid brick construction. Contracts have also been awarded for the construction of an addition to the machine shop, to be 50 x 112 feet in size. It is hoped to have both structures ready by Nov. 15 or Dec. 1, as the big Kissel works are now cramped for room and the enlargement of the output for 1912 makes more manufacturing space essential.

GRAND RAPIDS, MICH.—W. R. Link and Fred Hicks are promoters for a new industry, the purpose of which will be the refinishing of automobiles. Mr. Hicks at present is connected with the Adams & Hart company in the capacity of contractor for the refinishing business and he is an experienced workman. He will manage the factory end of the business, and Mr. Link, who is quite well known in the city, will have charge of the offices and publicity branch. The company will be incorporated for about $30,000, it is expected, and a new two-story building will be erected for its accommodation.

ST. LOUIS—The Central Route, which follows in a general way the old Boone's Lick road and the Santa Fé trail, has been designated the official Missouri State Highway by the State Board of Agriculture, on con-

dition that satisfactory progress is indicated in the improvement of the roads within the next few weeks. Governor Hadley and members of the Automobile Club of St. Louis recently made a motor car trip over the road selected in an effort to choose a State highway. The road is to be opened with appropriate ceremonies, including an automobile tour, about Oct. 15, according to present plans.

IRVINGTON-ON-HUDSON—The New York branch of the Locomobile Company of America has just delivered a combination chemical and hose automobile of 40 horsepower to the village of Irvington-on-Hudson.

NEW YORK—Byrne, Kingston & Co., makers of the Kingston carbureter, have established a metropolitan branch office in the Buick building, 1733 Broadway. The former headquarters of the concern were at 1650 Broadway.

LOS ANGELES—Brown-Symonds Co., 1140 S. Olive street, have taken on the agency for the Stutz car, built by the Ideal Motor Car Co., Indianapolis, Indiana. They expect to enter one of these cars in the Santa Monica road race.

PITTSBURGH—J. Eugene Beck, with offices in the Jenkins Arcade building, has secured the agency of the Midland line of automobiles manufactured by the Midland Automobile Company of Moline, Ill. It will have four models, including a two-passenger runabout of 40 horsepower and a seven-passenger 60 horsepower.

BROOKLYN—E. J. Montigny, owner of the Plaza Garage, Bedford avenue, near Bergen street, who was formerly agent for the Abbott-Detroit, has closed a contract with the Ideal Motor Car Co., of Indianapolis, Indiana, for the sale of Stutz cars in Brooklyn and Long Island. He expects to receive his first demonstrating car the early part of September.

BUFFALO—The firm of Baker Bros., Geneva, N. Y., and E. H. Green, Cole 30-40 distributors, have consolidated under the firm name of Baker Bros. Motor Car Company. The firm have taken quarters at 846 Main street, Buffalo. Baker Bros. will continue to sell Cole cars in Geneva. This branch being under the direction of Clarence Baker, E. H. Baker and E. H. Green will handle the Buffalo business.

SEABROOK, N. H.—This town possesses the star motorists' trap. An automobilist who pleads guilty is "let off" with a $5 fine, to which is incidentally added "costs" of $1 apiece for each constable who is on the job (there are usually three or four besides the complainant, who gets $1.62 for his extra exertions), $1.38 to the judge who hears the case, $1 to the State secretary, $5 to the State treasurer. Steep as is this total, it is usually cheaper than pleading not guilty, for in this instance the luckless motorist, if found guilty, is mulcted to the tune of $25, besides the expense of traveling to New Hampshire to attend court.

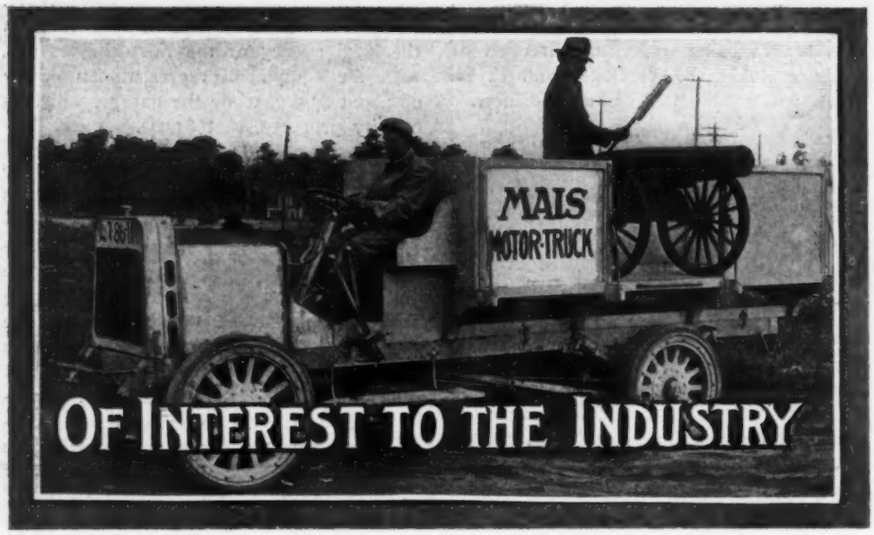
WASHINGTON, D. C.—A bill to establish a Federal Highways Commission, whose duties it shall be to urge the co-operation and joint action of the several States with the Federal Government in the construction, improvement, and maintenance of permanent and durable highways throughout the United States, prescribe such rules of agreement in connection with their use as will insure uniform and equitable highway regulations, and issue Federal licenses governing interstate automobile travel or commerce, was introduced by Representative Linthicum August 16 and was referred to the Committee on Interstate and Foreign Commerce and ordered to be printed.

WILMINGTON, DEL.—A week's successful service, performing with satisfaction the work of four horses and two wagons, has convinced the Police Department heads of Wilmington that they made no mistake in adopting a motor patrol wagon and relegating the horse-drawn vehicles. Basing his calculations on the experience of the past week and his knowledge of automobiles, Chief of Police Black believes the automobile now in use here, a six-cylinder 40 horsepower Pierce-Arrow, will pay for itself and the garage in which it is housed and which was built by the city expressly for it, within the next two or three years. The machine, which was bought through the local agency of the Foss-Hughes Co., with the equipment, represents an outlay of about $3,500, while the garage, which is on city property, cost $1,000.

BALTIMORE, MD.—Sign posting on the road between Baltimore and Annapolis has been completed by the Automobile Club of Maryland under the supervision of Secretary H. M. Luzius. This is in line with the pledge made at a recent meeting of the club to complete as soon as possible the posting of all roads leading into Baltimore within a radius of ten miles. Work will soon be started on the Frederick, Washington, Hagerstown and York roads. Secretary Luzius and his workers made the trip over the State highway, eight miles of which he says is in excellently improved condition, having been newly laid. Through the courtesy of the Mar-Del Mobile Company, local representatives, a Packard delivery wagon was used for carrying the signs, post tools, workers, etc., while Secretary Luzius used his Cadillac car in directing the work.

FOND DU LAC, WIS.—A résumé of conditions in the motor car field at Fond du Lac, Wis., discloses facts that are regarded as typical of similar cities in Wisconsin. Local sales agents sold approximately 165 cars from Jan. 1 to Aug. 15. Of this number 39 cars were purchased by residents of Fond du Lac, about fifty were sold to farmers and the remainder in a small territory surrounding Fond du Lac. The average price of the cars was $1,250, which is about 20 per cent. lower than the average for the preceding year, and indicates the trend of the trade at this time. There is also a change of the base of the market. Formerly the agent sought city buyers and did not attempt to interest the farmers. To-day the farmers are the sought and the seeking and are taking the larger percentage of the total sales. The city trade practically takes care of itself and requires no particular effort on the part of the agent. Fond du Lac is a city of upwards of 17,000 population.

Three-load Universal motor trucks recently sold to a big brewing firm in Detroit



INDIANAPOLIS, IND.—Will H. Brown, president of the Mais Motor Truck Company, came to the rescue of charity workers here with an original method of getting crowds out to a fair for the benefit of a fresh air mission. Mr. Brown had a cannon built and mounted on a truck. Advertising cards telling about the fair were loaded in the cannon and by a strong spring trigger attachment, they were shot forth along the streets into the crowds as the truck was driven all over the city. A bugler rode on the seat with the driver and gave a "military" atmosphere to the "stunt."

NEW YORK—A. O'Donnell has been promoted manager of the New York office of the Booth Demountable Rim Company.

SAN FRANCISCO—The Abbott-Detroit "Bulldog" has now covered 31,000 miles in its contemplated journey of 100,000 miles.

LOS ANGELES—The Chanslor and Lyon Co. has announced that it has taken the agency for the Pacific Coast of the Kelly-Racine tire.

DETROIT—The Packard Motor Car Company announces that recently the company shipped thirty cars and ten trucks from the factory.

ST. LOUIS—The agency for St. Louis for Cook's Auto Transmission Lubricant has been placed with the Marine Supply Co.

GALION, O.—W. E. Dunston has been appointed general manager of the Ditwiler Mfg. Co., manufacturing the Ditwiler steering gear and other products.

CLEVELAND—W. S. Eaton, formerly superintendent for Jas. Cunningham, Son & Co., Rochester, N. Y., has accepted a position with the White Co., Cleveland, O.

BERNARDSVILLE, N. J.—Bernardsville Fire Co. has appointed a committee to look after the purchasing of a motor-driven pump automobile with 1,000 feet of hose.

OCONTO, WIS.—Frank Smith and H. N. Bradley have formed a partnership and will build a garage and repair shop on Superior street.

HUDSON, WIS.—The Hudson Garage Co. has been incorporated and chartered with an authorized capital of $10,000. The promoters are Emil E. Meyer, W. M. Grant and Chrs. Nickelby.

NEW YORK—After a trip of 2,536 miles the touring Commer truck has returned to New York. The company announces that the average gasoline consumption was one gallon to 7.1 miles.

PITTSBURGH, PA.—The Vulcan Motor Supply Company has been organized by Frank H. Seely, Jr., J. G. Tite and H. T. Slater at Altoona, Pa., and will do a general automobile business.

HARTFORD, CONN.—The C. W. Kelsey Mfg. Co., makers of the Motorette, announce that this name has been duly registered as a trade mark under Patent Office Trade Mark registration 52,764.

BOSTON, MASS.—The Commer truck is the latest to secure an agency in Boston, having been taken on by the Dodge Motor Vehicle Company, that also handles the Pope-Hartford and the Waverley electric.

CLEVELAND—W. F. Melhuish, formerly sales manager of the Croxton-Keeton Company, has been appointed manager of the sales department of the White taxicab.

NEW YORK—C. A. Mezger, Inc., announces that the prices of Soot Proof spark plugs will probably be reduced this fall. If such action is taken, the company states that sales after Sept. 1 will be protected.

SAN FRANCISCO—The Pioneer Automobile Company has secured the agency in Northern California for the Commer truck and Guy Vaughan car, representing Wyckoff, Church & Partridge, Inc., of New York.

BELOIT, WIS.—J. H. Saris, agent for the Ford in Beloit and surrounding territory, has leased the former Broadway Skating Rink building and will remodel it for garage and salesroom purposes. The building is 130 by 49 feet in size.

SHEBOYGAN, WIS.—The Erie Garage, North Ninth street, owned and conducted by H. E. Smith, has been purchased by Harry Black and I. E. Clarenbach. Extensive improvements will be made. The Erie Garage was the first in Sheboygan.

PITTSBURGH—The Kittanning Motor & Transfer Company is a new concern at Kittanning, the capital of the coke region, formed by G. H. Burns, J. S. Claypool, Roy M. Cox, D. L. Schaffer and D. E. Aceland of that place. The company's capital is $5,000.

PITTSBURGH—The Bessemer Motor Truck Company has been formed at Grove City, Pa., by I. M. Louis, A. M. Allen, L. M. Monroe, J. E. Marshall, E. J. Fithian and W. H. Shellits of that place. It will have a large garage and several important agencies.

MILWAUKEE, WIS.—The Kopmeier Motor Car Co., 375-389 Summitt avenue, Milwaukee, Wis., has closed a contract for exclusive representation in the State of Wisconsin for three years of the Fiat car. The Kopmeier company is distributor of the Chalmers and Detroit Electric lines.

ST. LOUIS—The Brooks-Latta Company, which now has an experimental plant at 4255 Fairfax avenue, has secured an option on a lot with a frontage of 200 feet at Sullivan and Lambdin avenues, on which it is planned to build in the near future a factory for the manufacture of motor cars and delivery wagons.

NASHVILLE, TENN.—The Hager Elliott Engineering Company has opened a garage in connection with its large machine and repair shops on McGavock street. The new building has 24,000 square feet of floor surface and is the home of the Peerless, Velie, Empire and Paige-Detroit.

OSHKOSH, WIS.—The Crane Taxicab Co.'s building at Fifth and Wisconsin streets was badly damaged by a wind and rain storm. Preparations had been made for a large addition, and the excavations weakened one of the side walls. A new structure will now be erected on the same site.

TOLEDO, O.—The new home of the Roberts Toledo Automobile Company is rapidly nearing completion and will be ready for occupancy early in the fall. It is located at the corner of Madison and Eleventh streets, Toledo, and will face sixty feet on Automobile row. The first floor will be used as a display and salesroom and the second floor for repairs. A modern freight elevator will be installed.

WORM-DRIVE AND COMPENSATING GEAR—This gearset consists of a bevel gearing system driven by means of a gear and worm.

3. Fig. 1 shows the combination of a pair of aligned axle sections A A, bevel gears B B secured to the inner ends of these sections, and a worm gear G G mounted co-axially with respect to these sections and containing a spider frame S. One or more journal pins extend radially in the spider frame, each pin having a key slot in its outer end, with keys in them and extending into corresponding slots in the worm gear. A planetary pinion journaled on each pin meshes with the gears on the respective section of the axle shaft, a pair of housing sections H H encloses gears and pinions and turns with the spider. The housing sections are journaled on the gear hubs. A gear casing surrounds the axle sections, enclosing also the worm-gear and the housing sections. A worm W is journaled in the gear casing and meshes with the worm gear G G. Roller bearings placed between gear casing and housing sections hold the latter in position.

No. 999,876—to David E. Ross, Brookston, Ind., assignor to the Ross Gear & Tool Co., La Fayette, Ind.; granted August 8, 1911; filed December 16, 1908.

NUT LOCK—Being a specially constructed device, consisting of the elements described as follows.

This patent relates to the combination of a lock with a nut and bolt and a washer provided with a relatively thin portion having parallel grooves extending from its outer periphery. A central upstanding boss having vertically extending passages is provided, the passages communicating with the grooves referred to, which are parallel with the bolt opening in the nut. A locking pin has legs adapted to be forced along the grooves, which abut against a rear arched wall at the upper end of the passages in the boss, whereby the legs are deflected downwardly through the vertically extending passages in the boss. The bight portion of the locking pin is so bent as to engage the adjacent sides of the nut.

No. 999,842—to Carl Emil Nielson, Madera, Mexico; granted August 8, 1911; filed July 30, 1910.

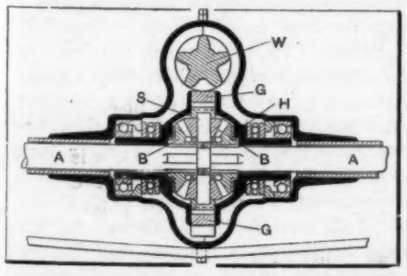


Fig. 1—The Ross Worm Drive and Compensating Gearset

SAND DISTRIBUTING VEHICLE—A construction intended to carry and distribute sand or like material.

1. The patent refers to a vehicle with a hopper mounted on the same and two feedwheels charged from the hopper with the material. The wheels are connected by a flexible cross member. On each feedwheel shaft is mounted a main friction wheel engaging an auxiliary friction wheel. To an oscillatory shaft are journaled a pair of spring-urged intermediate friction wheels, one of these wheels being adapted to engage one of the main wheels and the other intermediate wheel to engage with the auxiliary friction wheel. A driving friction wheel is provided which engages with one intermediate wheel while the other intermediate wheel engages with the auxiliary friction wheel.

1,000,004—to Werner Huber, Sihlbrugg, Switzerland; granted August 8, 1911; filed August 24, 1910.

ADJUSTABLE ELECTRIC LAMP—This is a construction in which the lamp may be adjusted relatively to the reflector of the headlight.

1. The headlight shown in Fig. 2 comprises a lamp with closed back B, a parabolic reflector R therein and a short flange F integral with it. The non-rotatable sleeve S extends through the flange and may be moved inwardly or outwardly through the office of an axial screw shaft A actuated by an adjusting nut N, whereby the position of the plug holding the source of light relatively to the lamp reflector is altered.

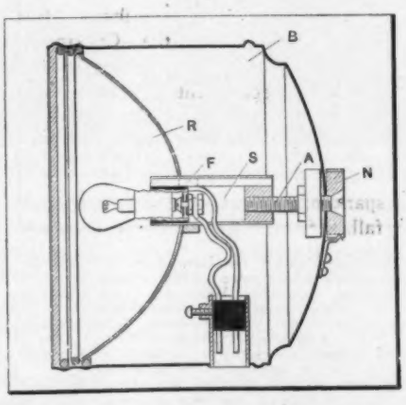


Fig. 2—Perry Electric Light with adjustable lamp socket

No. 999,860—to Ward S. Perry and Julius O. Eis, Chicago, Ill., assignors to Vesta Accumulator Co., Chicago, Ill.; granted August 8, 1911; filed November 15, 1909.

INTERNAL COMBUSTION ENGINE—This patent covers the combination of two opposed cylinders with an interposed crank-chamber and connections thereof to the cylinder spaces, the engine operating on the two-stroke cycle.

1. The engine illustrated in Fig. 3 is a combination of two oppositely arranged cylinder castings having an interposed crankcase, the walls of the cylinders having a longitudinal passage each, connecting the combustion chambers with the crankchamber by means of an inlet port. The pistons reciprocating in the cylinders open and close the inlet ports mentioned alternately. On the opposite side of the cylinder wall outlet ports communicating with exhaust passages are provided, which are also alternately opened and closed by the movements of the reciprocating engine pistons.

No. 1,000,128—to George F. Swain, Chicago, Ill.; granted August 8, 1911; filed January 28, 1909.

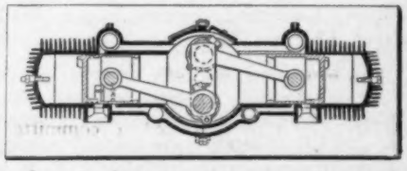


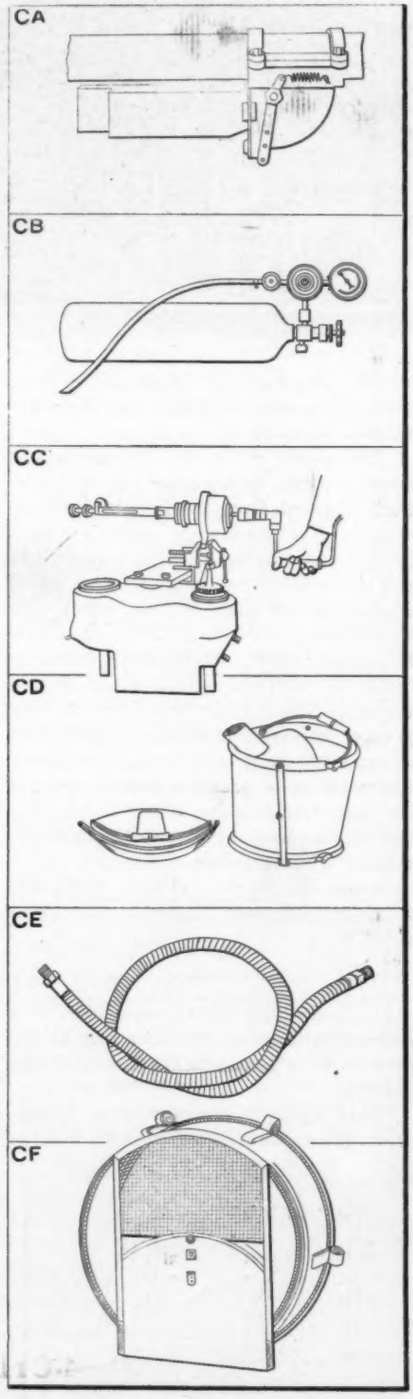
Fig. 3—Swain two-stroke cycle engine with opposed cylinders

Seen in the Show Window

EXHAUST horns utilize the pressure of the hot gases expelled by the motor, permitting the gases to by-pass from their regular path and to flow through a pipe or whistle, where the sound is produced. The Autolarm horn which seen at CA is placed betwen the motor and the muffler, a butterfly serving to close the way of the gases to the silencer and directing them to the pipe. Owing to its position the signal can neither clog nor jar loose. The material of which this signal is made is fully able to withstand the deteriorating influence of the motor exhaust, and especially because of the protected location of the horn the metal will not be attacked during its time of service, even if this should last as long as the life of the car the signal is installed upon. Operation of the signal is by means of a pedal arranged on the footboard in front of the driver, this pedal being connected to the signal proper through suitable wiring. It is made by the Gray-Hawley Manufacturing Company, 607 West Fort street, Detroit, Mich.

AS an example of a compressed-gas tank which will permit the chauffeur to keep the tires full of gas at all times the "Improved Baby" tank is shown at CB. It is filled with carbonic acid gas under a high pressure, the carbon dioxide being filled into the tank when in the liquid state. If the outlet is opened the "carbonic" gasifies and expands into the tire. The tank is made of steel of great strength, thus being capable to hold the gas under the high pressure obtaining in the vessel, which is more than 200 pounds per square inch. To inflate a tire, the hose connection is pressed against the tire valve and the valve at the end of the tank, controlling the outflow of the compressed gas, is opened by turning the nut seen in the illustration. Thereby, the carbonic acid gas is permitted to flow into the tube until the gauge attached to the tank indicates the desired tire pressure. Then a turn of the valve nut in the opposite direction closes the tank tightly. The "Baby" holds 4 pounds of gas all of which may be utilized in pumping up the tires of the automobile on which the carbonic-acid tank is installed, which is the product of the Liquid Carbonic Company, 432 Wells street, Chicago, Ill.

THE type of valve reseater shown at CC is being made by G. F. Crone, of 332 Genesee street, Buffalo, N. Y. It is, in a way, similar to a milling machine cutter, and cuts out the valve seat in the cylinder besides serving to true up the face of the valve. A brace operates the tools performing this work. The machine here illustrated is of a novel type, and contains an improvement in the shape of a vise holder which is fastened to the cylinder head while the face of the valve is worked upon.



CA—Gray-Hawley autolarm horn utilizes the exhaust gases of the engine
CB—The Improved Baby gas tank contains four pounds of carbonic acid
CC—The Crone valve reseater is built along milling machine lines
CD—Duplex folding pail is handy and waterproof and contains a strainer
CE—Almond flexible steel tubing may be used for many purposes on a car
CF—Ajax sliding door tire trunk for keeping tubes separately and protected

A WATER pail which is collapsible so that it may be transported in the tool box and also provided with a screen to keep foreign substances out of the vessel into which the water is poured, is the description of the useful accessory shown at CD, this being the Duplex Folding Pail. The left-hand view shows the pail in the collapsed state and the right-hand one ready for use; the skeleton of the pail is of elastic metal bands and the material of the pail itself perfectly waterproof. This handy vessel is manufactured and sold by the Planet Company, located at 170 North Elm street, Westfield, Mass.

UNITING great strength with elasticity, steel tubing is fully on a par with flexible brass tubes, and the absolute absence of rigidity is seen at CE, where the Almond Flexible Tube is shown. This connection is of steel, and will render good service to connect carbureter and gasoline tank, gas tank and headlights, or the oil reservoir and the oil pump on an automobile. The T. R. Almond Manufacturing Company, of 1 Maple avenue, Ashburnham, Mass., is the maker of this article.

FOR transporting spare tire tubes on an automobile when touring, the tire trunk illustrated in Fig. CF may be used. It is made of a metal body covered with weather-proof fabric which serves equally well to preserve the tires in spite of the violent heat of the Summer sun and from oil which would otherwise spill over them through the carelessness of a driver. The trunk is strapped to the body of the car and is opened and closed by sliding down and up the door which is able to travel in a guideway. Thus the tubes are kept in a place by themselves, where they cannot be damaged by any tools or like apparatus; nor is there any danger of the tires being stolen from the trunk, because a lock of reliable make insures the owner against the intrusions of any interloper of the road. The trunk here shown is the product of the Ajax Trunk and Sample Case Company, of 91-93 Mercer street, New York City.